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THE SPORTSMAN'S HANDBOOK.

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THE SPORTSMAN'S HANDBOOK

TO

PRACTICAL COLLECTING,

PRESERVING,

AND

ARTISTIC SETTING-UP

OF

TROPHIES AND SPECIMENS.

TO WHICH IS ADDED

A Synoptical Guide to the Hunting Grounds of the World.

By ROWLAND WARD, F.Z.S.

SECOND EDITION.

With Numerous Additional Illustrations.

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THE AUTHOR, 166, PICCADILLY.
SIMPKIN, MARSHALL, & CO., STATIONERS' HALL COURT.
1882.

CHARLES DICKENS AND EVANS,
CRYSTAL PALACE PRESS.

This Book is Dedicated to

THE REVERED MEMORY OF

THE LATE HENRY WARD,

OF LONDON,

(MY FATHER),

WHOSE EMINENCE AS A PRACTICAL TAXIDERMIST,

AND AS

TRAVELLER, SPORTSMAN, AND NATURALIST,

I PRIZE LIKE AN INHERITANCE,

AND AFFECTIONATELY EMULATE.

ROWLAND WARD.

PREFACE.

A FRESH EDITION of this book being called for, I have taken the opportunity to comply with an expressed wish of many sportsmen, by making considerable additions to that portion of the work which is designed to explain the practical operations of a naturalist—as well on the field as at home—for the preservation and preparation of trophies; and I have sought to make the particulars offered as plain and explicit as possible by illustrations and diagrams. I hope these may achieve my object, and that I may have succeeded, without greatly adding to the bulk of the book, in augmenting the practical usefulness of it. In that division relating to the HUNTING FIELDS OF THE WORLD is presented the most recent and authoritative intelligence I have been able to obtain in respect of the existing condition of some principal regions, having due regard to the shifting of the game. I have added some illustrations that may serve for the reader's identification of trophies obtained in the three great continental regions of the world for sport among great

game. The indications of *habitat* given are necessarily of the most general kind, and are subject to alterations in detail, which result from influences operating under some conditions so rapidly that only in their presence can they be accurately determined. The true sportsman will make these considerations always an element in his judgment when he chooses his ground. I trust that such gentlemen will do me the favour to assist me on this subject, with information they only can afford, which will be valued in high degree, not only by me, but by those sportsmen to whom I may be able to make it known.

R. W.

July, 1882.

PREFACE TO THE FIRST EDITION.

I HAVE made an endeavour, by the following pages, to present for the sportsman-naturalist some information that may be valuable to him as derived solely from *experience*—either the accumulated experience of my family, of whom I am now the only representative in our profession, or the carefully collected experience of others in those parts of the subject where my own work has not carried me. My grandfather was a practical naturalist; my father, the late Henry Ward, became eminent in the same way, but with some remarkable advantages, having travelled much in pursuit of his profession in both hemispheres, and notably as the companion of Audubon, when that distinguished man was so greatly enriching and extending the field of natural history. My brother, was one of the best known and most skilful operators in artistic taxidermy that we have ever had in this country. I have been greatly assisted by the information given me by many travellers and true

sportsmen. It has been my object to avoid mere speculative opinion, and to make the book as concise as might be.

It is only in comparatively recent times that taxidermy has been elevated to claim any real art position. What has been gained for it has not been achieved by mere skill, but by extended and more accurate observation of nature in its living forms—of the behaviour and habits of animals, not simply examination of their carcases, or what remained of those. Such observation, carefully and correctly recorded, is invaluable to the naturalist who seeks, by the preservation unimpaired of the natural features of an animal, to use the verisimilitude so obtained as an aid to art illustration. The material means for such a result are indeed important; but something more may be done with a prepared group of animals, or a single specimen, than preservation for the identification of details in anatomy or of outward appearance. Its value to the student may be preserved and increased by displaying its beauty truthfully to life, while the beauty is recognised for its own sake by even the unscientific. This is the cause I advocate, and the end I have in view.

R. W.

May 12*th*, 1880.

THE

SPORTSMAN'S HANDBOOK.

INTRODUCTORY.

In starting from this or any other country on an expedition for collecting, that is likely or certain to separate him from the means and conveniences that he can command for money in settled and civilised communities, it is all important for the explorer or sportsman to provide himself carefully with everything he may want. But it is more important still that in doing so, he be able to define what his real wants are, and restrict the satisfaction of even these with skill to the smallest proportions. He should therefore quite judicially consider what he really does need that it is desirable he should take with him, because he cannot obtain it so well elsewhere; but it is not well to imagine possible difficulties or wants, and endeavour to provide for them particularly. In regard to most of the apparatus, simplicity is to real usefulness like his skin is to a nigger. Attention should be paid to appropriateness of dress, but always with the recollec-

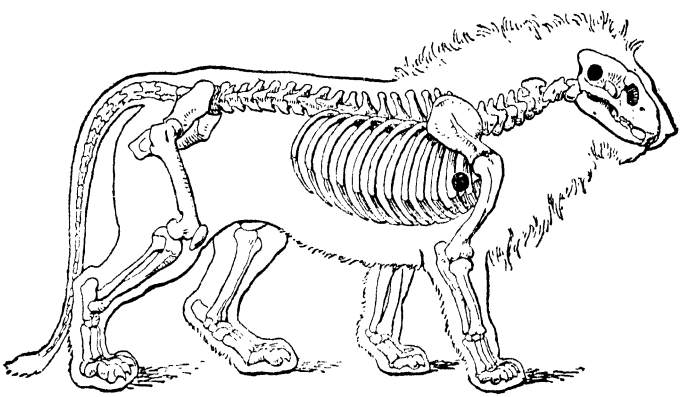
tion that in this respect a small modicum of native experience in any country is worth any amount of speculation out of it. That observation may also apply to most of the shifts and expedients of camp life. The well recorded experiences of good sportsmen, who have gone in similar fields before, are of infinite value to instruct; not for the simplicity of servile imitation in particulars, since the conditions may entirely differ, but as exemplifying the principles on which given means were applied to certain ends. Important factors in the consideration of these questions are the strength, stature, and constitution of the sportsman himself.

The progress of invention has of late years strengthened the position of the sportsman in respect of his armament, especially as regards great and dangerous game. He has wide choice of excellent weapons. In quite recent times this abundant facility has a little vexed the question, and some good sportsmen think they recognise the obtrusion of not indeed a fresh element, but more prominence for it—the endeavour to cloak deficiency of skill by increase of mere mechanical power in dealing with great game. In reality, the conditions have not changed for the true sportsman, who seeks rather an exercise of his skill and courage than the silly vanity of copious butchery. Indifferent ability may find compensation of a kind in that, but hardly the admiration of the judicious. In selecting particular weapons, each man will follow his bent; but on some points there is a consensus of opinion among good men that should strongly influence: That in the hands of a true sportsman of fine skill the chosen weapon for dangerous game should be light in relation to his personal

strength, so that his ability to wield it easily may be without doubt: The "Express" rifle, on account of its easy carriage and manipulation, its power for internal wounding, its accuracy and extended point-blank range, is lauded by many as all-sufficient for ordinary game: For large game and dangerous animals a heavier bore is of course requisite, but one of not excessive capacity is considered sufficient for credit in good hands: The weapons should be carefully suitable to the stature of the sportsman, and to his length of reach, etc. There are some details, too, that have much to do with success—indeed, are almost, in such circumstances, a condition precedent of it—viz. the temper (hardness) of the ball, shot, or missile, the quality of the powder, and the quantum of the charge. These points should have careful attention. Experience on the field is the only true guide (our own or others'), and experiments are only valuable according to the conditions. Although sportsmen among great game have at all times had only such arms to deal with as they at the time possessed—sometimes arms that seem now quite primitive in comparison with modern weapons—the testing by sportsmen of such arms in real action is the only true test; indeed, eye and hand, as confident agents of undisturbed skilful judgment, are as important active forces for the result as the powder that utilises the best-made missile, or the most accurate bore of any index. The gentleman who can, without erring, do all that is prescribed to clamped boards and puddled clay on an English sward, might find his calculations disturbed by the short rush of a rogue elephant, the sudden deadly spring of a tiger, or the oncoming of a heavy buffalo, who has at last become convinced that only one course is open to him.

The sooner the sportsman realises that his operations with great game cannot be reduced to the symmetry of a game of chess, the better will he be able to best guard his own safety and create success for himself on whatever field he may turn his attention to. In fact, nothing can be of more value to him in those circumstances than quick apprehensiveness, delicate tact, strong cool courage, and exquisite skill in the accurate use of his weapon. But underneath all this should lie a knowledge of what experience and investigation has taught us of how best to achieve our end; and one important phase of this knowledge is, how and where is it best to strike the game in a vital part, or in such way that the animal may be disabled. And here it must be remarked that no amount of book instruction will equal a small amount of experience; therefore it is well, when the game is killed and comes to be cut up, always to make a sufficient special investigation as to the course of your bullet in regard to its effect on the vital parts. In order to make clear what is the position of these points, some diagrams of animals representative of species are given, and on them the points are indicated. It may be said generally that the brain and the heart are the real organs to injure with vital effect; but to these must be added the spinal column. Now with different species of animals, in various circumstances, the conditions under which these parts can be reached vary considerably. We may consider the animals in two classes: (*a*) those that are dangerous, (*b*) those that are not seriously dangerous. These may again be divided into (*c*) animals that are in natural condition unsuspicious, or quiescent; (*d*) animals infuriate, aggressive, charging. To speak first of the

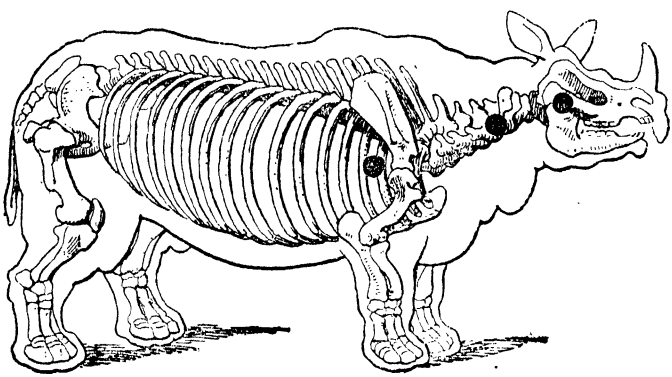
Felidæ. The place to hit a lion, if you are quite sure of your aim, as you may be if he is quiescent, is undoubtedly the brain. Now with tiger as well as lion, the brain is about the size of an apple, and small in comparison to the bony structure; the brain-pan is located about three or four inches to the rear of the eye (*vide* diagram). The heart is also indicated, and when the animal is broadside on, it can be pierced by a shot behind the shoulder. When he is charging



direct towards you, the best shot to deliver is a little to the right or left of the head, straight through the shoulder; by this you may perhaps pierce his heart, or possibly fracture the spinal cord; the bullet may traverse the body lengthwise with paralysing effect, or it will—which is most important—shatter the shoulder-bone and prevent his deadly spring. The rhinoceros is best killed by piercing the brain, or by fracture of the spinal cord. The brain is surely found in the region below the ear. The sportsman's position in regard to the animal will determine the possibility of

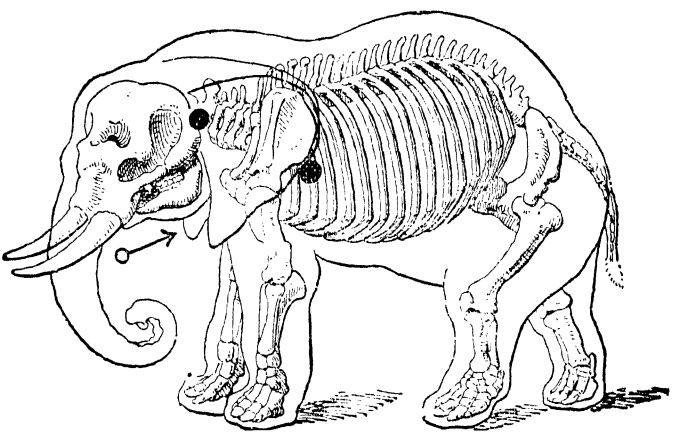
his reaching the spinal cord. The hide of the Indian rhinoceros is harder than that of the African species, but on the living beast is easily permeable by hardened bullets; still, where there is room for choice, it is best to shoot between the folds.

In certain circumstances the charge of a Cape buffalo or a gaur is among the most dangerous experiences of the sportsman. The same general observations apply; but the neck and shoulder shot is to be



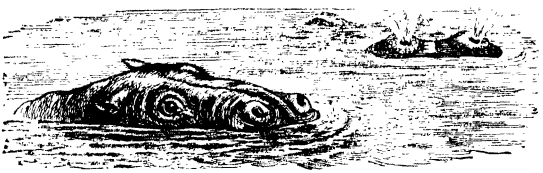
preferred. In regard to the elephant, there is a great difference between the African and the Indian. The skull of the first is convex in frontal form, while that of the Asiatic variety is concave. The brain is wonderfully small in comparison to the bony matter by which it is protected. The average weight of an elephant's brain is, say, nine pounds, which is but a fraction of the weight of the bone. The Asiatic elephant may be well shot dead while charging, if pierced in his forehead; but a similar shot would not be efficacious with the African. The brain of these creatures is

protected by a mass of cellular bone, which cannot well be pierced by a bullet, unless it be directed through the orifice of the ear. If he be charging towards you, the best shot is in the chest. The position of heart and brain is marked in the diagram. When an African elephant is undisturbed, his great ear will furnish a sure direction for a deadly shot. Aim at the central portion of the outer edge.

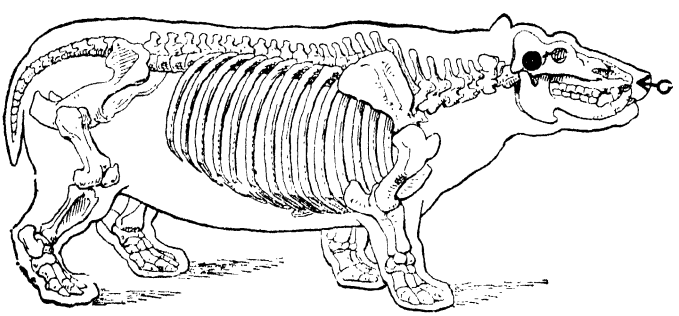


The hippopotamus if shot when he rises to the surface of the water, should receive the bullet up his nostril; that is the surest road to his brain. When stricken the beast sinks, and it may be an hour or two before his body rises; the time depends greatly on the temperature of the water. If he is shot on the shore, his heart should be aimed at behind the shoulder, half-way up his body in the line of his leg—the general rule. The seal should be shot in the brain, but the locality of his brain is very deceiving. It is

peculiarly back toward the neck, as shown in the drawing.



For collecting some small animals and birds, shot-guns of selected gauge, throwing appropriate shot, that need not be particularised here, are requisite.



A more humble, but in its degree an equally useful implement for the collector, and one which he can employ to remarkable advantage, is the blow-pipe. Some savage races use this weapon—for it can be made by skill veritably a weapon—with astounding accuracy of aim and certainty of effect. In taking a lesson from them it is not necessary to misapply the means to any purpose for which the gun is more appropriate. But the collector will soon experience that, for many small specimens, he can use a blow-pipe with effect

where he may not be able to use firearms. The implement is so simple and so easily constructed that the price of it is inappreciable. About three feet length of any straight metal or wooden tubing, ¾-inch diameter, through which a pellet the size of a marble may be thrown, will serve well, but an even longer tube may be chosen. The pellet should be of clay or any putty, rolled in the hand to easily pass through the barrel without too much windage. It should not touch the mouth, but be lightly placed just in the orifice, by stopping which with the thumb the tube can be conveniently carried loaded, muzzle up, ready for the most rapid use. To propel the pellet, the puff must be sudden and powerful. There is a proper way of effecting this. When a practitioner first begins to use the blow-pipe, it is a common error to eject the breath only direct from the lungs; he should acquire the habit of inflating his cheeks, so as to make a storage of wind, as it were, for each shot; that, added to the breath from the lungs, gives a force that will sometimes astonish him. The hand follows the eye in aim, and practice will often develop unthought-of proficiency. The particular uses of the blow-pipe are these: that its operation is silent and does not disturb, it is effective for small and moderate-sized birds not on the wing, it is easily manipulated in a wood, it is easily obtainable anywhere, and the ammunition costs nothing.

The question of traps, snares, etc., is one which more concerns the collector or trader than the sportsman. Many specimens can of course be collected by these means. A man's own taste will rule him in the adoption of them better than any precept or instruction. There are many ingenious devices used in America, Scandinavia, and other fields for the capture of game

of all sizes, or the destruction of them rather. It will be found, however, that the ordinary gin, of whatever size it may be made, remains the really most efficacious of all such contrivances. The employment of dummies and decoys for birds, and especially for shore-birds, is interesting and useful. Probably in all parts of the world ingenuity can adapt this resource in degree. As a rule gregarious birds are those most subject to the fascination, for such it is. To give examples in our own country—wood-pigeons can be attracted thus: Any carpenter can make the shape of a wood-pigeon in rough; no legs need be shaped, but a stick should project from the lower part of the breast, so that the dummy can be fixed on the ground, or placed in a tree, as may be required; this figure must be painted in colour to represent the pigeon, and the paint must be "flatted," that is, not glossy. It is astonishing how the wild birds will come down to their haunts when they see this dummy there to assure them. In like manner plovers, gulls, and similar shore-birds may be decoyed. The decoy-duck is made buoyant to rest on the water, and is well known. Verisimilitude in regard to action is a great gain sometimes with these last-named, and is more important than mere details of feather. The following may be adduced as an instance of this: I once employed a decoy to deceive some sporting companions. They were looking for a shot in the evening twilight, and I provided one for them by hastily making a dab-chick of a bung, two wine-corks, and some wire. This rude image would float upright when ballasted with a stone at the end of a string; to this string I attached a live roach, and set the whole afloat under his guidance down the edge of some tempting reeds. The progress and occasional plunging

of the fish communicated the most natural action to the dummy, and it received the complimentary recognition of many ounces of well-directed shot, until, being well killed, the cork was secured, and *not* added to the bag. This may afford a hint that can be utilised by ingenuity where it seems to be a gain.

An useful part of the sportsman's kit is a photographic camera. This sounds alarming, as suggestive of bulk and weight, and inconvenient dabbling with scientific *minutiæ*, and perhaps dirty chemicals; but, in truth, none of those fears need be realised. The whole apparatus can be contained in a small case eight inches each way. The tripod-stand—an important part—is made to fold into a stave two feet long, about two inches thick. The sensitive plates are dry and prepared ready for use before leaving home; the inconvenience of properly using them, if there be any inconvenience in developing the picture, is reduced to a minimum, in no sense commensurate with the gratification derived or the value of the work. An animal may be photographed with its surroundings, just as it fell; the picture may be made a nucleus of interesting and most instructive memoranda, of obvious value because such details are too often forgotten, or the impression made by them effaced, just in proportion as we move from the spot. Photographic pictures of living *feræ naturæ*, in their native jungle or forest, have indeed been thus taken, and hundreds of sea-birds on the wing wheeling over an Indian headland, have been reproduced with the most accurate representation of individual birds, so that when magnified the picture presents the perfect specimen for our contemplation—our more leisurely examination in fact—than if we had witnessed them in their flight. These

are enormous advantages to gain if they be rightly estimated and used. The dry plates, in favourable circumstances, require only a second's exposure for a picture. They need not even be developed on the spot, if inconvenient; the undeveloped negative will keep good for months. The most portable plates are those four inches by three inches; they are sufficiently large for most useful purposes, though of course larger plates for larger pictures can be carried. It is all important that the camera and apparatus should be good, the tripod true and firm.*

The knives or other implements should be as few and simple as is consistent with meeting the real need efficiently; a tiger can be perfectly skinned by a skilful hand with a shoemaker's knife, price threepence-halfpenny. It is highly important that some preparation should be made for efficient and accurate record of scientific data, concerning natural features that are evanescent, such as colour of the eye, of a bird's bill and legs, etc.; but it is not too much to say that the whole of such apparatus may, by well considered ingenuity, be carried in the compass of a case whose capacity is measured in a few inches. It must be borne in mind before all things, that the value of any object secured and preserved depends on the completeness with which all its natural features are saved, as well as the condition in which they are kept. This is true in degree for whatever purpose the object be designed, but it is essential in regard to specimens for the illustration of natural history.

* For photographing birds in flight, see "Visarap," Appendix.

GENERAL OBSERVATIONS FOR THE COLLECTOR.

Directly a specimen is secured inspect the eye, and make a concise memorandum of its colour and any peculiarity of its appearance. A similar note should be taken of any colour on the bills, legs, etc., of birds (the brilliancy of which may fade), and particular note should be preserved of eyelids, the colour of them, if they have colour; and the same may be said of wattles and all such features of naked skin, because most frequently when these parts dry, the colours not only fade, but change sometimes absolutely; and the taxidermist at home may be led to a wrong conclusion. Never omit, and never defer the making of these memoranda, or instant decision on the necessity for it.

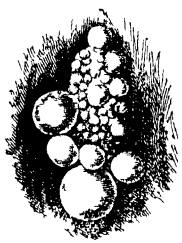
It is better that specimens of all warm-blooded creatures should be cold before they are operated on.

In dealing with birds care should be taken, directly they are shot, that the plumage be not broken, or injured by putting many of them together in a bag; and that the blood from one fresh specimen does not injure another. Instantly plug up with cotton wool the throat, nostrils, and all shot holes. Rare examples can

be isolated on a cone of paper, or otherwise, as soon as they are secured. It is often a scientific gain to save at least the *sternum* or breastbone, with the *caracoids*, the *furcula* (merry-thought), and *scapula* of birds, and the skull when the skin is not saved.

Pay particular and unvarying attention to the ticketing of specimens.

Tickets of convenient, durable material should be provided. Note thereon:—Date; a number; where killed; native name; scientific names; sex; habitat; habits observed, as to the eye, etc.; and peculiarities



of colour. Any other peculiarities, or facts noticed, To sex a bird, examine the inner regions of the loins, and if male mark it ♂, and if female thus ♀.

This question of ticketing, and the preparation of the ticket is all important. There is little, if any doubt that the brilliant colours on a fresh, healthy specimen, at the moment it falls, are always deteriorated, sometimes altered, under treatment by any preservative. Therefore, when the "colours" are noted, if possible, the collector should always put on his ticket a blot of water-colour pigment as near as may be, to reproduce the brightness and quality of the tint. This may need some ingenuity, but will be found not

difficult; a few cakes of water-colour and a brush take little space; the gain by this record will be great. The sexing is of much consequence; to determine it, where necessary, involves a slight dissection, when the appearances will be found as on page 14.

Corresponding tickets to those on the skins, etc., should be attached firmly to skulls, horns, bones, etc., and saved so that exact identification may be easy and certain.

Be as forethoughtful as possible in all operations; and be careful that no blood or grease, or juices from the offal, injure the feathers or fur.

It is generally far better to attend to the preserving of your own specimens, than to trust to native agents or servants; if you are compelled to trust to them at all, never sanction the use of lime in the materials they employ, even as a small constituent. Some natural substances (berries, etc.), used by natives, will change colour on specimens; the yellow ground of a leopard skin may be thus changed to reddish brown, etc.

PROCESSES OF PRESERVATION.

In regard to the preservation for after treatment of the skins of great game, it would be easy here to quote many recipes of approved efficiency, and, in given circumstances, not open to doubt. But, for the particular conditions of the explorer, the *simplest* process that is safe and good is the *best*. I think that the materials carried may be reduced to two, viz. a quantity of dry powdered alum and a supply of spirits of turpentine. How these should be applied I shall presently explain.

For the treatment of bird-skins a supply of arsenical soap should be carried. It can be compounded of the following ingredients:

Camphor	5 ozs.
White Arsenic, in powder ...	2 lbs.
Yellow Soap	2 lbs.
Lime, in powder	4 ozs.

Melt the soap completely by heat in a small quantity of water, and add the lime; then remove it from the fire and stir in the arsenic; next add the camphor, previously rubbed to powder with a little spirits of wine, and mix the whole thoroughly, till it has the consistence of paste. Preserve it in carefully closed glazed vessels, labelled "Poison." To use it, mix the quantity required with cold water to the consistence of clear soup, and apply it with a brush to the inside of the skins.

There are two methods of preserving animals, or the skins of animals, on the spot where they are collected till they can be transmitted for definite treatment by skilled practitioners at home: viz. (1) by means of preservative applications, so that natural decay and the ravages of insects, etc., may be pre-

vented; (2) by immersion and packing of specimens, on proper principles, in spirit, or in pickle. Convenience and obvious desirability will rule the adoption of either plan, and the application of it to particular specimens. Animals taken whole can be dissected; and examples of absolutely new species, or specimens of rare occurrence, may, at discretion, be transmitted thus with many advantages. Generally, pickle, or brine, preserves natural colours of specimens better than spirit.

PRESERVATIVES ON THE FIELD.—The skins of all mammalia, of fish, and of reptiles can be efficiently preserved for transmission home, by the simple dry alum process; but the skins of birds should be treated with arsenical soap. These resources, simple as they are, will be found sufficient, and they have this distinct advantage, that in the ultimate treatment of the specimen for permanent keeping, there are fewer difficulties to be surmounted by the skilled naturalist or the curer of skins. When salt, for instance, is used, or the lime of native Indian dressers (the most destructive in the world), or the vegetable curing of the Australian skins, there is often more trouble to take *out* of the pelt the deleterious substance, so that the process of decay may be stopped, than the specimen is worth. The skins of birds must not be treated with alum, or they become fatally brittle; the arsenical soap has a contrary effect, and softens the skin. All specimens or examples of either genus must be protected from the ravages of insects; and to do this the simplest means is the copious and judicious application of spirit of turpentine; but this must not be applied to birds, because it dissolves the grease that is more or less found in every bird-skin, and thus the metallic colours of plumage become permanently robbed of their brilliancy, and birds of white plumage

are soiled by a yellowish stain. Where, however, there are no metallic colours to be preserved, the advantage of turpentine as a preservative may be gained, if it be applied lightly and with skill to the surface of the feathers, and not poured over the skin, as we might do with the skin of a mammal. The best way is to apply it with a saturated pad of cotton wool.

THE ALUM PROCESS.—The material to be employed is powdered burnt alum. When the skin of a mammal has been removed, the very first thing to do, without loss of time, is to "flesh it," which means to carefully clean the pelt of all superfluous flesh or fat. This having been done, spread the skin hair downwards and peg it out flat, unless you have a frame or other better mechanical means of stretching it. The state of the weather is a consideration in this work. During the rains in India the air is charged with moisture, and it is difficult to dry anything by simple exposure. At such time, in any country, a skin pegged out would probably be spoilt, and the hair slip. It is more advisable, then, to use "pickle," described below. In hot weather pegging is easy enough. It should be managed neatly, so as not to injure the skin by tearing large holes. It is a good plan, when available, to get a few dozen long iron nails made with a bent loop at top for conveniently stringing them together when not in use; they cost very little anywhere, and are neater in use than wooden pegs. Of course of small animals in some portions of which the bone is retained —for instance the leg—the skin must not be pegged out; and indeed where means exist of avoiding it, do not "peg out" at all, as the skin is always somewhat injured by that process, and sometimes is irreparably torn, therefore avoid such injuries if you can. The

fact of drying induces shrinkage; so arrange your skin that as it shrinks it cannot wrinkle into folds, for in those, if anywhere, the ravages of insects will lie. In cold climates, perhaps, pegging and stretching may be avoided altogether. The skin having been spread out flat with the pelt uppermost, proceed to rub in the alum. This should be done with the hand carefully to cover every portion, and the supply of alum should not be stinted. It must be particularly applied to the lips, ears, feet, and other fleshy parts that have been prepared in skinning to receive the preservative (see p. 32). The whole pelt having been treated thus by hand, sprinkle it with the alum till it is regularly and well covered. The skin should be left thus until it is dry, and it will be found that the astringent alum will dry it with rapidity. But during this time it is most necessary to watch it well, so that if there appear a tendency in any part of it to "taint," which would cause the hair to "slip" or come off, the preservative may be instantly applied on the hair side as well as the pelt wherever requisite. When the skin is dry it must be conveniently folded, hair side inwards, for packing, that is if it be of large game and requires folding. First turn the hair side up and pour turpentine freely over it till the skin is thoroughly anointed. Note that with long-haired animals the turpentine reach the roots of the hair; sprinkle the pelt side; but it is not necessary to anoint that so fully as the fur. It is well, when convenient, to put some dry material in the folds to prevent contact between the inside of the skin and the fur; and, as occasion may serve, the skin should be unfolded and inspected, and more turpentine or preservative applied to parts if necessary. In the process just described the astringent alum is applied

to preserve the skin, and the turpentine to protect it against insects. The ravages of these pests in a hot climate, such as India, are indescribably vexatious, and must be carefully guarded against. The principal of all the marauders is a beetle about a quarter of an inch long, of a dark dirty colour with a transverse band of dull yellow; he does not often fly, being generally more busily engaged on carefully collected skins; but he can fly. His common name and his scientific name are "The Bacon Beetle;" or *Dermestes Ladratus*; but as

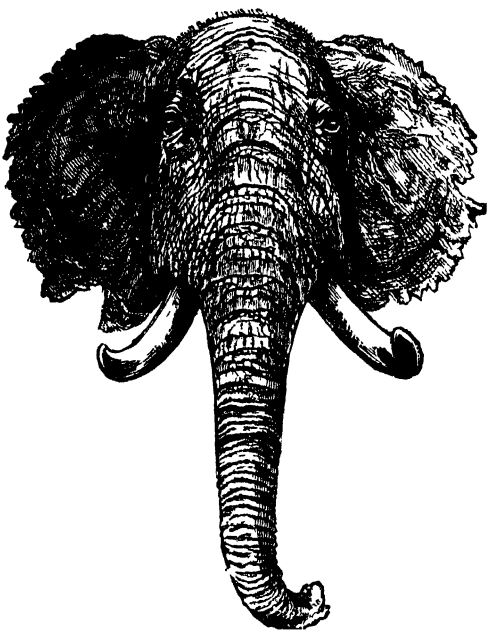
he is so veritable an enemy it is best not to rely on his cognomen, but on instant recognition for immediate extermination, therefore his portrait life-size is given on this page. Now this insect does not like any spirit; but the one spirit he really dreads as fatal to his constitution is turpentine. In the colder climates benzine and similar spirits are sometimes used and with efficacy, but these evaporate more rapidly in warmer temperature, and turpentine, if only because of its less rapid evaporation, is at all times to be preferred. I have sometimes unpacked trophies to discover the hair entirely removed from the pelt by the exertions of the *Dermestes*; and in like manner I have received skulls in London that have been imperfectly cleaned of flesh, from which I have shaken hundreds upon hundreds of fattened lively specimens. I gave them the turpentine they should have had in India. Sometimes they will recover activity after the milder influence of benzine. The alum process is quite sufficient for *Pachydermata*. All skins should be well looked after at night. During

the darkness, animals of various kinds, including half-starved village dogs, frequently lurk about a camp, and nothing comes amiss to their hungry maws.

PICKLE.—Another process that is frequently most convenient on shipboard, or, according to the conditions, is that of "pickling." The skin having been removed from the carcase and cleaned, instead of being laid out for drying, should be thickly covered over the flesh side with powdered alum, the lips, eyelids, feet, etc., being particularly treated; then it should be folded in a convenient form, and thus be immersed in a barrel of brine, or what is technically called "liquor"—in fact, parts of alum and salt dissolved in water, in the proportion of 6 lbs. of alum and 3 lbs. of salt, sea salt if possible. Dissolve both in a small quantity of hot water sufficient to make a gallon, and let the liquid cool before the specimen is immersed. The skin must be sweet and fresh at the time of placing it in pickle, or the operation will not succeed. The vessel must be kept closed. A number of skins may be placed in the same barrel, which is then ready, when quite filled, and closed, for storing, or for transit. If thought more convenient to make the package lighter for travelling, the skins can, when they have been thoroughly pickled for a few days, be taken out, spread open and dried, then repacked. This, however, is an operation requiring obviously great judgment, as if it be imperfectly carried out the consequence may be ruinous.

A conspicuous exemplification of the advantages in this process of brine-pickling, was afforded by the great elephant trophy brought from South Africa by H.R.H. the Duke of Edinburgh. In this case the system was adopted in manner following: The entire

skin of the mighty beast was preserved. The animal was undoubtedly one of the largest examples ever brought to this country of the African species. His height at the withers was 10 ft.; from tip of trunk to tip of tail, 23 ft. 5 in.; girth, 16 ft. 6 in.; from top of



head to end of trunk, 11 ft. 3 in.; circumference of head, 10 ft.; from ear to ear, 9 ft.; length of ear, 4 ft. 6 in. The skull and tusks weighed more than 3 cwt.; the skin of the head when taken from pickle, weighed 8 cwt. 6 lbs. The weight of the whole skin when taken

from pickle, was 20 cwt. 7 lbs. The weight of the entire elephant in the flesh was 4 tons 8 cwt. 4 lbs. On the field the skin, having been duly prepared, was folded in this wise: the flanks with skin of legs and feet were folded inwards, each half-way, so that the inner surfaces or flesh side were outwards; then the skin of the head was in like manner turned back, the trunk being disposed of longitudinally down the centre between the edges of the flanks; and the tail end with neither extremities was similarly folded back to meet the trunk. The whole skin was then rolled as tightly as possible round the head, and carefully tied at both ends of the bale. In this condition it was placed in a great barrel which was then completely filled with liquor, and properly coopered for transmission to this country. On arrival in London, when the head of the barrel was removed, the perfect success of this mode of transport was at once apparent. There was no unpleasant odour. On taking out the mass and unfolding the skin, it was noticeable that every part of the surfaces had been properly acted on, and there was not a single tainted fold. At that time it had been upwards of a year in the barrel. The old pickle was removed, the skin was refolded and restored to the barrel with a supply of fresh liquor, and the cask was re-coopered. In this manner the skin was preserved for upwards of three years more, until the decision as to how this great trophy should be treated was arrived at. The magnificent head was mounted, and is now in Clarence House; the feet (which supply an index of his size) were utilised for ornamental purposes, while the hide was cut up and converted to use; a considerable portion being made into walking-sticks, that formed appropriate mementoes.

The skulls of large mammalia are always removed from the skins. It is important for the proper preservation of the skulls of *Felidæ*, that they should be protected from injury to, or loss of, the teeth. This is best done as follows: When the skull has been boiled (not too much or it loosens the sutures) or soaked, and properly cleaned, and the teeth painted with wash about half-an-inch thick, it should be tied up in a calico bag and placed in a separate compartment of the packing-case designed for it. Stuffing should moreover be put into each compartment to prevent the specimen from being shaken, and so injured. The wash for teeth mentioned above can be well made of wax; as the tooth dries it often splits up, the bony structure as well as the enamel; wax tends to prevent this action.

When time and circumstances permit, there is another method of cleaning large skulls that may be useful. Tie a rope round the horns or antlers to secure them to the shore, and cast the skull into a stream or tank. When the horns (which have cores) become loose they can be removed and cleaned, the skull being left in the water until the flesh decomposing it can easily be scraped away. Ordinarily, however, it will be found that numberless small fish will be at work on it night and day, and will clear it well of all extraneous matter, if they are allowed time enough.

It should be mentioned in case of need, that many strong mineral and vegetable astringents can be used with more or less success besides arsenic, alum, and salt; such as saltpetre, powdered green vitriol, or sulphate of iron, corrosive sublimate, etc. It is also

maintained that white arsenic applied in dry powder, or mixed with spirits of wine to the consistency of treacle, and put on with a brush, is the best preservative of all. Of vegetable substances, gum kino, oak bark, willow bark, catechu, powdered nutgalls, or any such material rich in tannin, are available; and strong spices or strong tobacco powdered will keep off insects. A large skin, in default of anything better, may be plentifully dressed on the inside with wood ashes. The virtue of wood ashes really consists in their detergent properties; for, containing as they do a large proportion of potash, the fat is thereby converted into soap, and sometimes in this condition is immediately brought away by the hand, or the scraper, and as a preservative, excepting under difficult conditions, the effect is cleanly and good. Remember that there is a difference in ashes, depending on the wood employed. Oak is one of the best.

Fish.—The proper preservation of fish is undoubtedly a matter of some difficulty. Naturalists are perhaps not generally aware of how few examples of foreign fish reach this country in a condition that admits of effective after treatment, or how special a branch of the art it is to set them up effectively and well. The ordinary processes are: (1) to plunge and bottle them in spirits; and we all know the effect of that on the evanescent colouring, as well as on the natural contour of the specimens; (2) when they are skinned (see p. 56), to apply alum to those parts where the flesh cannot be perfectly removed, so that it may be dried, and to apply arsenical soap on the inside, for preservation of the skin.

Reptiles.—The skins of crocodiles, alligators, and

the larger reptiles having been removed (see p. 56), must be manipulated as follows: Clean them of all flesh as perfectly as you can; this, however, cannot be done very completely about the head, or the feet of a large example, and to those parts alum must be applied in plenty to dry up the flesh as well as may be. The roof of the mouth can be cleaned, and the tongue must come away. With smaller specimens that can be skinned over the skull to the lips, a similar application must be made where it seems necessary. To the inner part of the skins some arsenical soap, or wood ashes may be put; but, really, the preservatives are not nearly so necessary as in the case of warm-blooded mammals. Indeed turpentine that will protect them from insects will afford nearly all the protection they need. The skin can be rolled or folded for transmission. With snakes, the skin dried flat can be rolled from the tail like a ribbon, the belly side inwards on account of the scales. Small specimens of any species will go in spirits. Carbolic is a useful agent in cleansing all reptiles.

Immersion in Spirit.—Something must be specially said about this mode of preservation, for there is absolute necessity that it should be properly carried out, or nearly all the advantage of the resource is neutralised. Either fish or reptiles, or even birds, that may be sent home in spirits, should be treated in this way: First provide a tub, or other convenient vessel, full of the spirit, wherein the specimens can be put as a preliminary measure, so that the mucus, water, etc., may be drawn out of them. Before placing them in this a moderate incision should be made, with as little disturbance as possible, in the belly, so that the spirit may permeate all parts. Keep the specimens

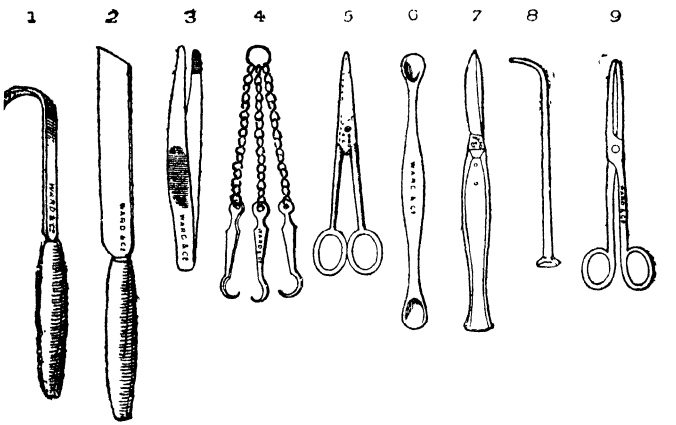
in this spirit from a week to ten days, then transfer them to fresh spirit, and let them remain in that for about two weeks more, before finally you remove them to the vessel or vessels of spirit in which they are to be packed for the remainder of the journey. Reptiles, being less watery than fish, generally require only one change. The first tub of spirit may be used for more than one set of animals, but will of course decrease in strength by the addition of the water drawn from them; the second spirit should be stronger; the third quite strong enough to be readily inflammable. They will then be safe for more than six months, and can be sent home. Proof spirit, diluted about one-half with water, is perhaps the best to use, but rum or gin serves well. The specimens can be packed for transmission in great numbers thus: Wrap each fish or reptile in a piece of linen or cotton rag, and arrange them to rest closely in an appropriate vessel that can be then filled completely with spirit. A wooden packing-case, well lined with tin, that can be hermetically soldered up when quite full of the liquid, serves well. Of insects, beetles can be transmitted in spirit. The native spirit, "daru," called by Europeans native liquor, and sold in all the native bazaars in India, will do very well instead of rum, etc., for preserving reptiles. It is very cheap.

INSECTS.—The majority of insects having been properly stored as directed (see p. 59), require little more than a supply of camphor, or cyanide of potassium, to protect them from decay. Mites sometimes appear in them as an evidence of taint, and then the best means for destroying the intruders is benzine. But some very large moths, butterflies, and beetles require a different treatment. In such cases the body must be opened by a longitudinal section on that side not intended to

e displayed, and as much matter must be removed as an be got away without impairing the specimen. 'he cavity thus created should be filled with corrosive ıblimate in a dry powdered condition, and the incision ıust be neatly and skilfully closed over it.

SKINNING AND PREPARATION.

'HE apparatus necessary for the skinning of animals ; really very simple, and I strongly advise that it

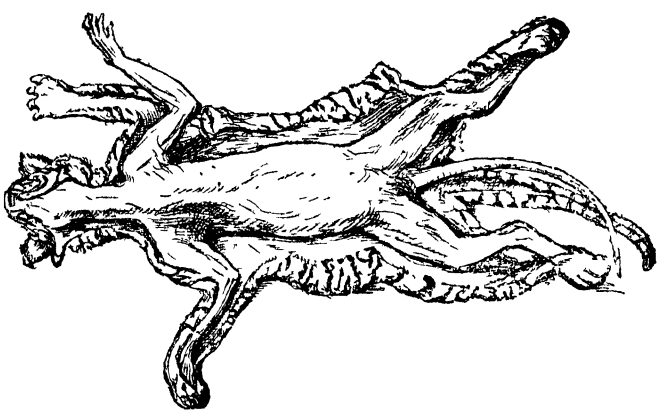


hould be kept to the simplest proportions. It is the xill with which the knife is wielded that is more im- ortant than the best of knives. A shoemaker's knife, small saw, a pair of pliers, and perhaps a pair of utting pincers, are all that are required for operating n the most important game. Some small implements or small specimens being added, this is all the kit hat need be carried. To understand the principle of he thing, and to adapt that principle in practice with ıgenuity and judgment to the particular conditions hat present themselves, is the true learning; and to

cumber the mind with numberless minute memoranda of other travellers' experiences in emergencies that may never be our lot, is an useless task. Enrich the recollection with all that experience brings to bear on the subject in deductions, to illustrate or to inform, but not to copy simply of necessity. The best operator is he who does what is right to carry out his purpose, carefully, on true principles, according to the means at his command, and the advantages of surrounding conditions; he who simply copies what others have done in given circumstances, forgets, probably, the conditions under which they succeeded, and that the conditions are not necessarily the same in his case. Let a man be master of the occasion and his position will be good, even if it is different from any that has gone before. Now what has to be done is simply this, and the remark applies equally to large or small game, mammalia, birds, reptiles, or fishes. A beast having been slain, or a specimen secured, we have to remove the skin, preserving the exterior natural features, as completely as possible; then the skin—cut as little as may be—because it would otherwise decompose under the influence of climate, etc., such decay must be averted by the application of preservatives, and when it is packed so that it is protected, the trophy may be sent home. But the preservative and precautions necessary in an Indian or African climate, may be modified in North America, and in highlands or lowlands, in forests or exposed positions. There is, in fact, no preservative, or book recipe, or tale of other persons' experience, that can compare in value to quick true judgment, and cultivated common sense. I shall describe in as much detail as appears necessary the skinning and preparation of one animal represen-

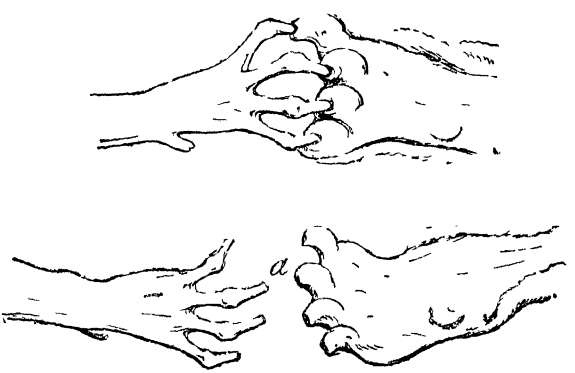
ıtive of each class; and my reader must trust himself ɔ adapt the practice by the light of his own judgment ɔ the specimens, large or small, with which he may ave to deal; and he will soon find his practice surpass a usefulness the most compendious (and cumbersome) ɔook of recipes and directions.

Large Game.—When the great game is secured, ınd is ready for the operation, first turn the animal on ts back, and, stretching apart the fore and hind legs,



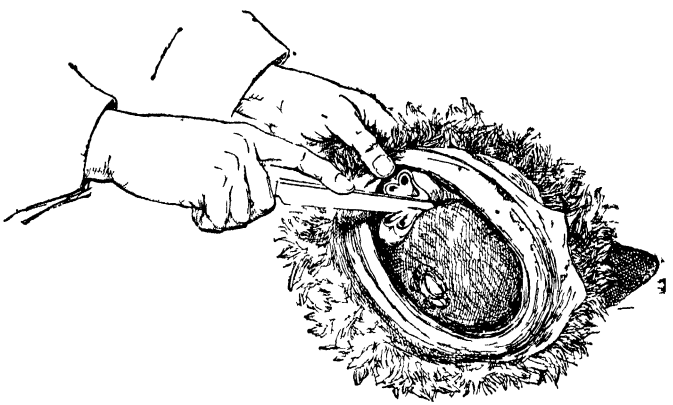
proceed to remove the skin. In all cases where the skin is wanted entire, this is best done by making an incision from the corner of the mouth, through the medial line of the belly to the extremity of the tail; but in doing this cut only just through the skin, and be careful not unnecessarily to injure the carcase, or especially the intestines; next make lateral incisions in order to strip the limbs; for the forelegs from the

edge of the central incision through the armpit, along the inner side of the limbs, the line of incision inclining slightly to the outer portion, in order that the seam may be less perceptible when the perfect specimen is mounted. A like process through the groin is necessary for the hind legs. These incisions thus made leave the skin in form of tongue-pieces over the breast. First apply the knife to these points, and detach the skin round to the spine and along the tail. In doing so it is necessary to clear the limbs, and great



care must be taken to leave intact the natural features of the foot. The last metacarpal and metatarsal bones may be left in the skin, whether with the smaller specimens of *Felidæ* or *Cervidæ*; but in the big animals it is better to remove them altogether. Now turn over the carcase, and draw back the whole skin over the head, exercising particular care in separating the ears

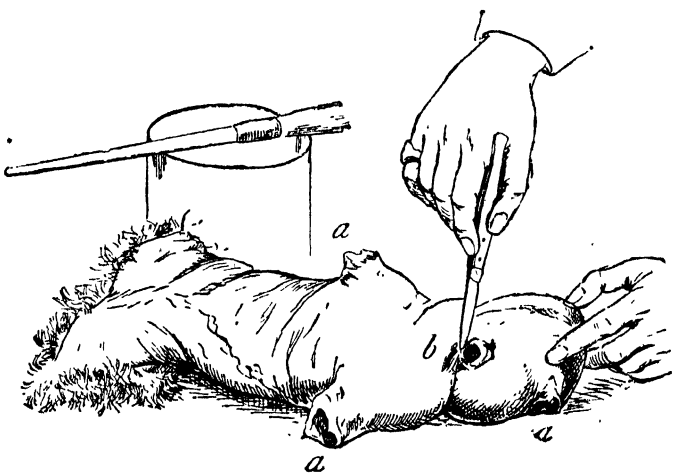
and the eyes from the skull. Similar care must be taken as to the lips, for if the rim of the eyelids be severed by the scalpel the injury spreads in a remarkable manner, often so badly as to render the damage seriously conspicuous. The ears should be parted from the skull close to the bone, or the lower structure of them will present too large an aperture. The lips must be cut off close to the gums. Having thus taken off the skin, it must be cleared of all superfluous fat and flesh—and all the fat and flesh is superfluous.



The cartilaginous portion of the ear must be turned through. The lip must be treated thus: Pass the knife betweeen the mucous lining and the outer skin all round the mouth, so as to admit of the preservative penetrating this thick portion of the specimen completely. The eyelids and the feet must each be treated in a similar manner for the same reason. Be careful that the claws or hoofs are well kept.

A great deal of the description above well applies to the skinning of a fox's head, which I particularise

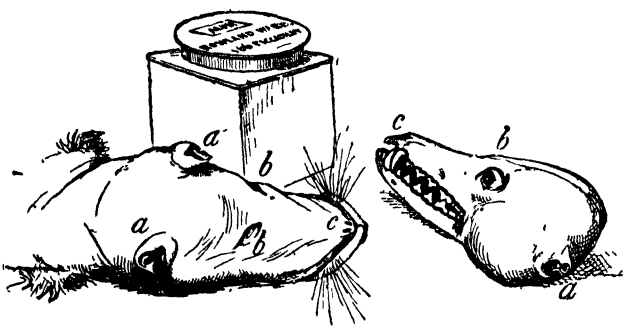
because it is an operation that very frequently exercises the amateur naturalist, and it well serves to exemplify the proper treatment of most hornless animals. The last illustration shows the process of turning back the skin so that the cartilage of the ear may be operated on. The succeeding block is designed to explain the delicate operation of treating the eyelid —a part of the work over which the greatest care must be taken. The removal of the lip at its junc-



ture with the gums, and the cutting of the nostrils, are treated in the next illustration.

A fruitful source of trouble to the sportsman in Ceylon, India, Africa, etc., is the proper treatment of an Elephant's foot. This feature is a recognised trophy, as well as the head, because it is a gauge of the size of the specimen, and because in ordinary circumstances the skin of this mighty beast is so difficult of transport, and although it can be converted by skill

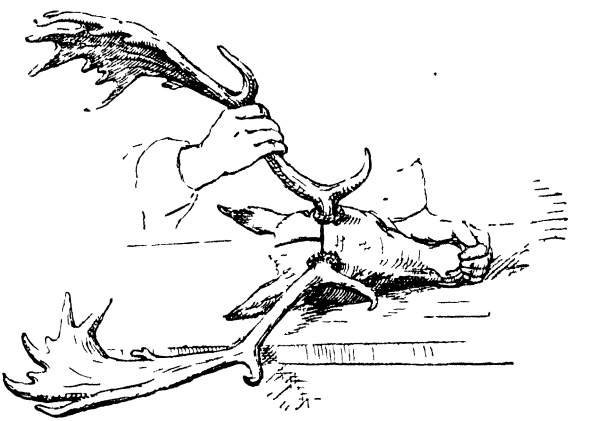
into innumerable articles of domestic utility, the value of it in private hands is not always appreciated. It is different with the foot, excepting that it is particularly adaptable for conversion into useful articles, without impairing its natural history significance. The foot should be severed at least eighteen inches from the ground—that is to say, the skin should be severed. Cut the skin down the back of the foot right across the sole to the toe; a second cut must be



made across the sole so as to form a cross with the first, but these incisions must not be carried so far that they would be visible when the foot is imposed on the ground. Now separate the skin from the flesh, and bring the casing of the foot away in one piece. Clean it carefully, and apply powdered alum both inside and outside, then place it to dry in the shade, taking good care that the skin does not fold, and is in all parts accessible to the air. It is not absolutely necessary that the skin dry in natural shape, but it is

important that the foot be protected from insects, and to this end, when the specimen is quite dry, saturate it as far as possible with turpentine. Rhinoceros and Hippopotamus can be treated in the same way.

Something must be specially said as to the head. It frequently happens that it is desired to save the head for preservation as a trophy, while the other part of the skin is either abandoned or saved for a rug. Heads with antlers or horns are prepared for

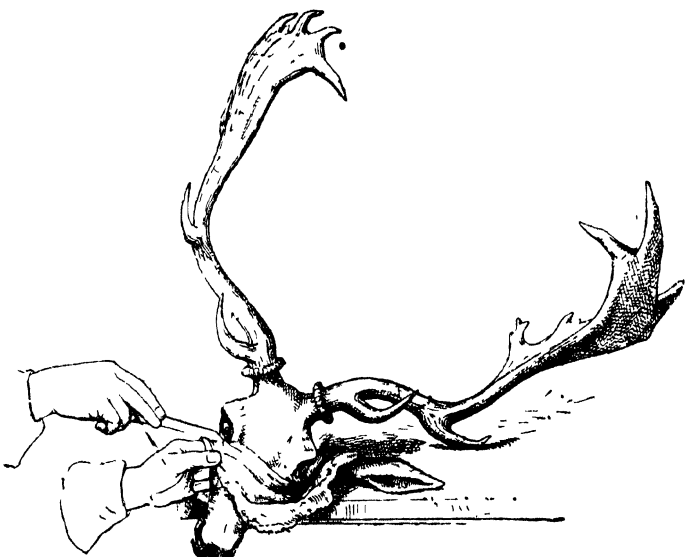


preservation either in the naked bone or to be set up to imitate living nature. For this last, care must be exercised to take the skin of the whole neck. Make the incision up the back of the neck, over the head between the ears until the horns are reached; if they are wide apart cut between them right and left, carrying the incision right round the burr of each horn. In separating the skin from the burr the knife should be used neatly with a plunging action of the point, so that

not a particle of hair or skin be sacrificed at this part. He is a bad workman who leaves a morsel of the skin attached to the bone. In clearing the scalp be very careful not to let the knife injure the skin; the knife must be deftly used. But there are other features with which this skill is more important still—to wit, the eyes, the nostrils, and the ears. The delicate skin round the eye is nearly hairless; it must not on any account be torn or jagged. In a head the eyes and

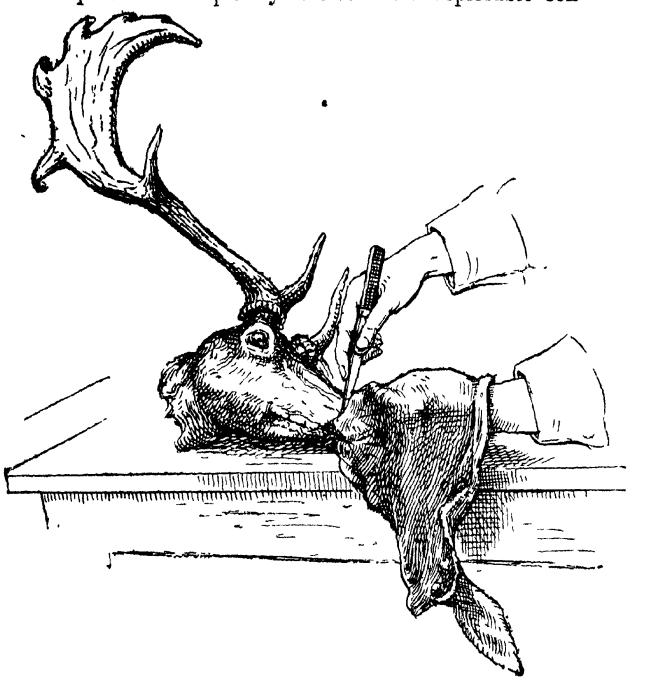
the nose are the most prominent parts, first claiming notice. In treating the nostrils and upper lip operate from inside the mouth; sever the lip neatly high up the gum, over the teeth; and in like manner detach the lip below. The skin will present in these portions a particular thickness, into which, from the inside, a neat midway incision must be carried all along, so that the preservative may penetrate and be carefully rubbed into the cut to the end that these parts may be saved

properly. The alum process is best; but if more convenient the skins may be preserved in pickle (see p. 21). Clean the skin well of all fat and flesh; rub in the alum, but not on the outside of the nose, and hang up the skin to dry. If there should appear any likelihood of the short hair round the eyes and nostrils slipping, apply some alum judiciously there. Be sure to save



the lower jaw. When the head is of Wapiti, and is to be set up thus, it may be a matter of great convenience to pack the horns, and to do that the skull, to which they are attached, may be sawn in two, longitudinally, by which much space may be gained. But if the trophy is to be mounted in the naked bone, this severance is quite inadmissible, and it should in no case be adopted with smaller heads, which are, in fact, almost destroyed

by it, the skull is thereby weakened, and at the end of the journey broken to pieces. Such a state of things necessitates great extra labour and expense even if the injury can ever be repaired. North American trophies are frequently received in a deplorable con-



dition from this sort of injury, by which neither convenience nor economy can have been secured. For preservation in the bone, the flesh may be roughly taken off, and the skull be cleaned by boiling, by maceration in a stream, or by burying it for a proper time in an ant-hill. But be sure and keep the

specimen from dogs or other animals. In regard to the ears, when the skin is off, and you have separated the cartilage close to the bone, trim it neatly with the scissors of all that is not wanted inside, but do not take too much, or an unsightly hole may appear when the head comes to be mounted. Next insert the thumb and finger from the inside so as to separate the inner from the outer skin, forming, as it were, a flat bag; do not carry this separation too near the edges. Into the division preservative must be carefully put. It is my practice to fill the space with composition, which

keeps the ear for ever the proper size and shape. The old way of sewing a piece of card on the outside is not good, it allows the skin to shrivel and shrink, and its natural beauty is seldom or never to be restored. Some horns (as *Ovis Ammon*) have "bearers," or a bony core, from which the horns may be detached and packed separately; in this instance the skull should be kept, and so much of the bearers as seems superfluous may be removed.

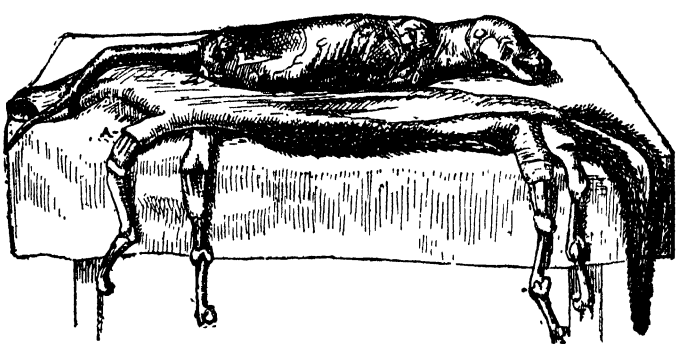
Another attractive trophy is the foot. Whether it have a cloven or solid hoof, many most useful and ornamental things can be made from this feature. To

save it properly, the skin should be opened longitudinally at the back, but not detached from its juncture with the horny substance. All flesh, muscle, and sinew should be removed, as well as the bone which is not required. In the illustration the bone is depicted as it comes away from the hoof.

SMALL MAMMALIA.—These can be preserved for dissection and preparation, when necessary, in spirit; or, as described in the cases of large skins, in liquor. When they are treated thus, incision must be carefully made in the trunk, and the intestines, with as much blood, mucus, etc., as possible removed; the liquid will then penetrate, and the carcase should be soaked in spirit or liquor for some time, in order that the juices of the body may be drawn out into it, and then the specimen should be removed into fresh spirit, strong enough to light with a match, and so packed. The receptacle should be quite full.

In preparing the skin the following course should be adopted: the skull and the bones of the legs are to be left in the skins. The animal being placed on its back, make incision from the *sternum* (breast-bone) to the root of the tail, next separate the skin from the carcase, so far as can be conveniently reached, and sever the limbs from the body at the shoulders and thighs. Each limb can then be drawn out—as a glove might be turned inside out—but the bone must not be separated at its junction with the toe, or the skin of the foot or leg be in any way injured. Now remove the muscles from the bone. This can best be done by cutting the tendons near the toes, and carefully drawing the whole mass away at one operation. It must come in one piece, not piecemeal. The bone will now be

clean. Clean the skin of the limb, and at the same time the other parts of the skin of all superfluous flesh and fatty matter. Dress the inside with arsenical soap, and apply freely powdered alum all over it, but particularly to the fleshy parts, as the eyes, nose, lips, feet, etc. Then replace the bones in the limbs, having previously, if possible, bound them with tow, or similar material, so as to replace the muscle that has been removed. Place a portion of stuffing in the skin of the head and trunk, and suspend the specimen



to dry. The animal figured in the illustration is an Otter.

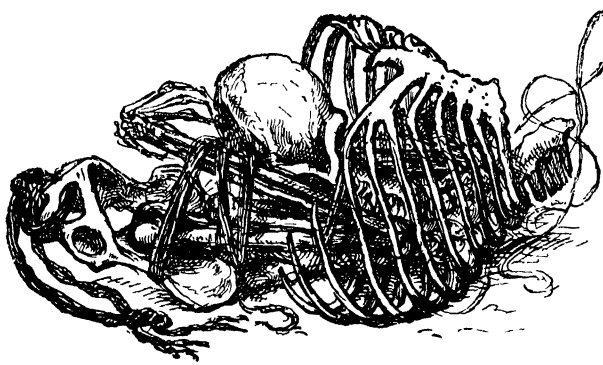
The tail can be treated in two ways. With an Otter, for instance, it should be cut underneath to the tip, and the bone removed; but with the Fox, and most other small mammals, it should be treated thus: sever the *vertebræ* from the trunk close up to the body, leaving the tail in its sheath. Turn back the skin until enough of the tail protrudes to fasten securely with a string, that can be attached to a hook, or tree, or other firm

holding. Then with a cleft stick, or the handle of your pliers, pull the skin sheath down toward the tip, and the *vertebræ* will come away whole, wrinkling the skin to the end. Shake powdered alum into the cavity, or, if preferred, insert arsenical paste on a stick.

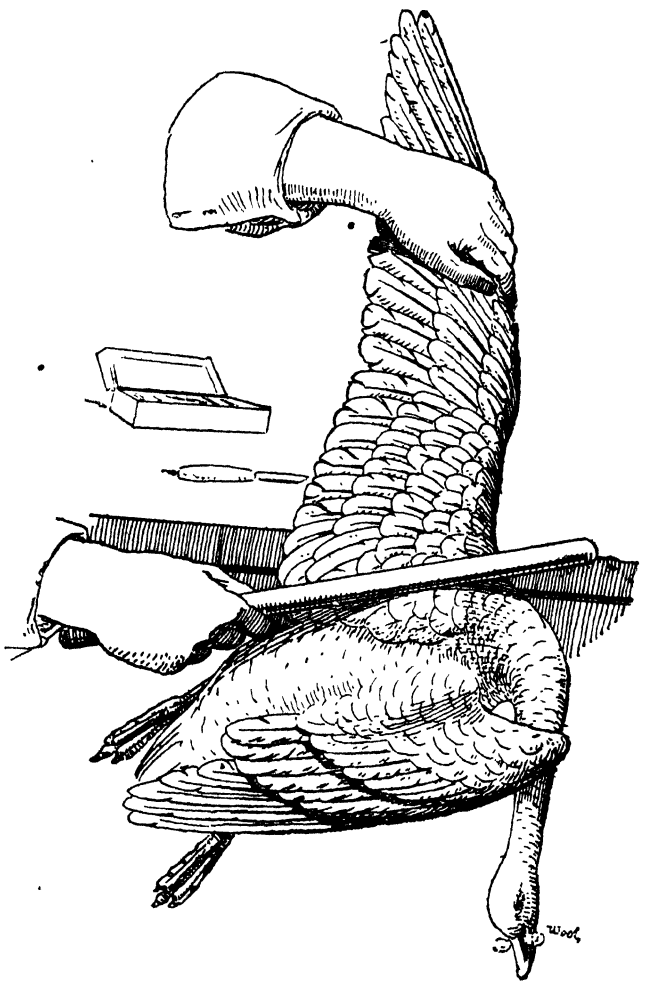
SKELETONS.—When it is desired to save the skeleton of an animal, the procedure should be this: Having removed the skin, cut the fleshy parts away; this need not be done too closely, neither is it necessary nor desirable in the operation to separate the joints. The bony frame, or its portions, should next be placed where they can be covered by water, the object being first to extract all blood, therefore it is well, as occasion requires, to pour off and renew the water, until it comes away comparatively clear. The next operation is to leave the skeleton in the liquid till the soft portions putrefy, and so leave the bone clean. The large bones that contain marrow must be perforated at either end, where the holes will be least observed, and returned to the water. They will come clean in due course like the others. The complete operation of this putrefying will occupy several months, but is expedited by a warm temperature. When the decay of the fleshy matter is complete, the bones must be cleaned by hand, and should then be immersed for a few (say 6) hours in a weak solution of lime-water. The bones are by this time quite separated, and it is all-important to care that not one, even the smallest, be missing; the loss of one little portion vitiates the usefulness of all—a skeleton incomplete in any part is of no value. The bones must next be bleached by the simple action of the atmosphere in

the shade. If the operator be abroad the bones may then be packed for transmission; if he be where skilled assistance can be obtained, they are fit for articulation. The illustration shows the skeleton of an Orang arranged for packing.

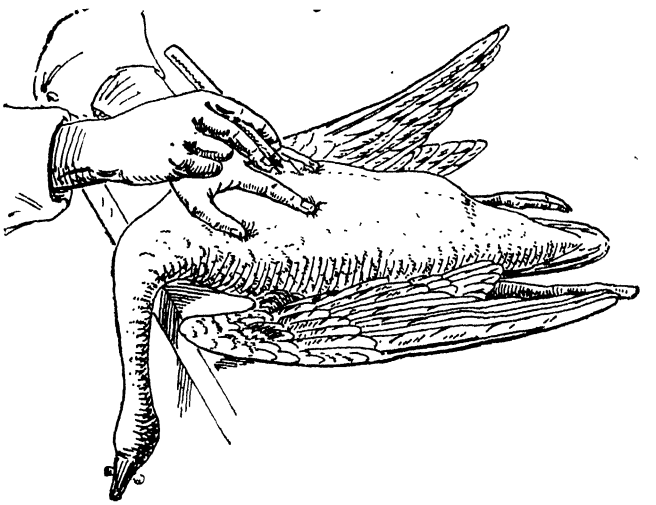
BIRDS.—Having seen that the cotton plugging of the throat, nostrils, and the shot-holes is safe, the first operation is to break the wing-bones (*humeri*) close to the body. If the bird be a large specimen, the most convenient and effectual way to do this is to hold the



bird pendent by his wing against the edge of a table or board, so that the bone may be fractured by the sharp blow of a stick, with as little rough treatment as may be. But the doing this skilfully is indeed the gist of the whole work; there is a proper way of doing it. The wing must be held by the upper feathers, pressed flat by all the fingers against the palm, so that the manipulation do not crush, or even seriously disturb the lay of the fibre. The blow with the stick

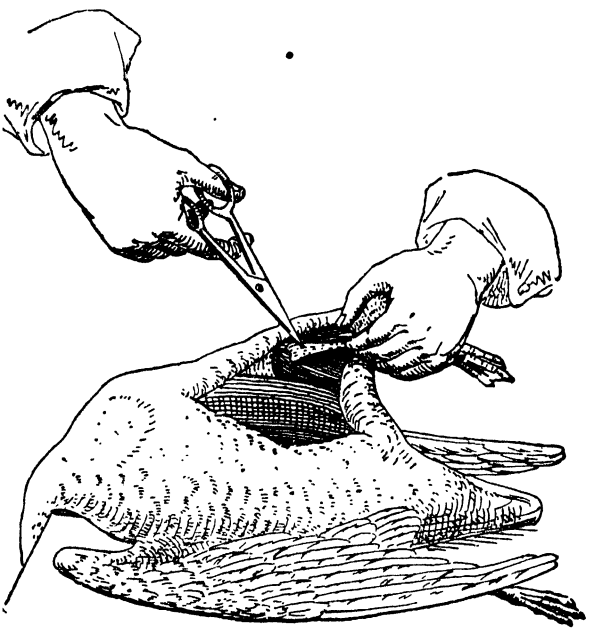


must be a firm quick stroke of sufficient strength to complete the fracture, not simply to bruise the flesh, or so rough as in breaking the bone to unduly mangle it. The firmness of the board or table-edge is a great element in the neatness of this operation. The action of the hand will best be seen on the accompanying illustration.



This is the method for treating large birds. In the case of small specimens—that is anything less in size than a blackbird—the same bone may be well broken by the thumb and finger, or at most by the forceps. The wing-bone being thus broken, place the bird on his back, the head toward you, in order that your knife may, what is technically called, "go with the grain of the feather." By this I mean that the point of the knife should be deftly inserted under the

skin, just at the end of the breast-bone; raise the skin till it bags, then press the knife forward in one clean continuous incision down to the vent, so that the skin be separately severed, but the flesh remain uninjured.

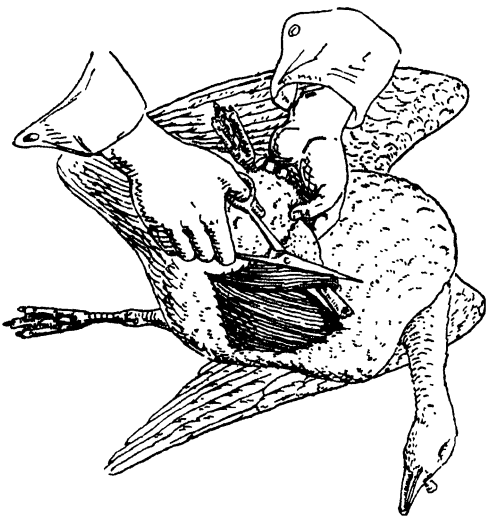


Amateurs are constantly inclined to make their first incision from too high or too low a point; and the mistake of injuring the stomach in any part is another danger that besets them. The opening thus made in the skin should be no larger than is necessary for the

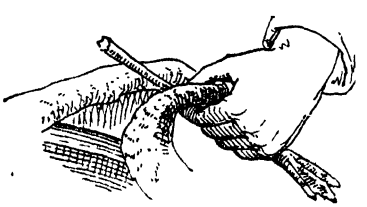
withdrawal of the body. For this purpose only is it made. Indeed with birds that have breasts of specially beautiful plumage and short feathers, as well as with divers, and aquatic birds, it is often desirable to make the incision under the wing. The great object is to get the body out of the skin in the cleanliest fashion, and so that none of the internal grease or juices soil the plumage. The overwhelming advantage then of a neat operation, so that the body remain practically unbroken, will be apparent at once. Sometimes it may be desirable to take the body out through the back, when the incision is made in the same manner as it would be on the breast. In fact the features to be especially preserved will rule the operator's choice in this respect. I, however, now suppose that the cut is made from the breast-bone as seen in the illustration.

Now put down the knife, and use the hands only, for the fingers are the best instruments. Insert the fingers under the skin on one side, and clear the skin from the flesh in all accessible parts. That done, insert below the skin a sufficient quantity of dry plaster of Paris, or such other similar material as, wanting plaster of Paris, you may be compelled to use to absorb such blood or other moisture as may at the moment be present. Treat the corresponding side in like manner. Next proceed to force out the leg. In order to do this, hold the leg firmly above the joint, and force the thigh through the aperture, at the same time carefully drawing off the skin; insert the point of the scissors below the flesh next the bone, and move them skilfully up between the bone and muscle, until, by raising the right hand a little, the scissors can

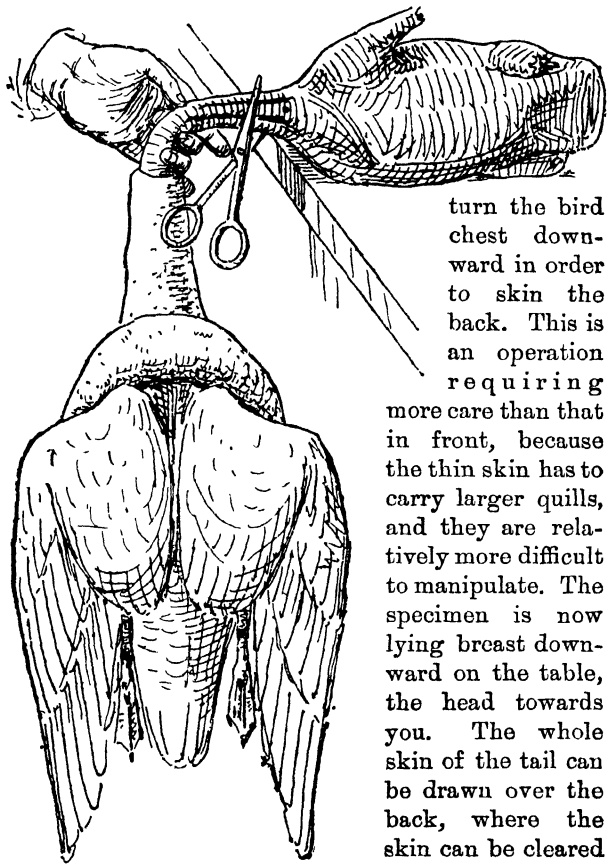
be made to nip the bone transversely just against the joint; cut the bone through and you can then thrust



it out naked from the flesh, and with the scissors cut the tendons next the *tarsus*, and the whole muscle of the thigh will come away in one piece, leaving the bone clean. This bone must be cut near the femur joint, leaving the head of the bone which is useless with the flesh attached to the thigh and body. The bone, when thus freed, should appear as above. Having treated both legs thus, skin up to the root of the tail, but in severing the *vertebræ* leave the whole triangular projection in which the feathers are imbedded



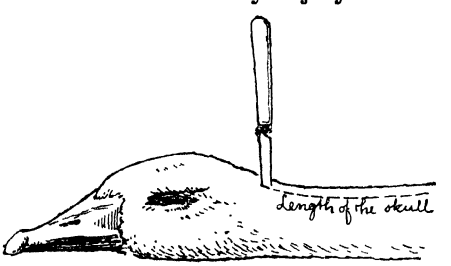
for after treatment. It is a common error to cut this portion too low down, and much trouble results. Now



turn the bird chest downward in order to skin the back. This is an operation requiring more care than that in front, because the thin skin has to carry larger quills, and they are relatively more difficult to manipulate. The specimen is now lying breast downward on the table, the head towards you. The whole skin of the tail can be drawn over the back, where the skin can be cleared by the blunt side of the scalpel, and the body will thus be freed down to the wings. Here free the body by cutting the flesh through with the scissors at

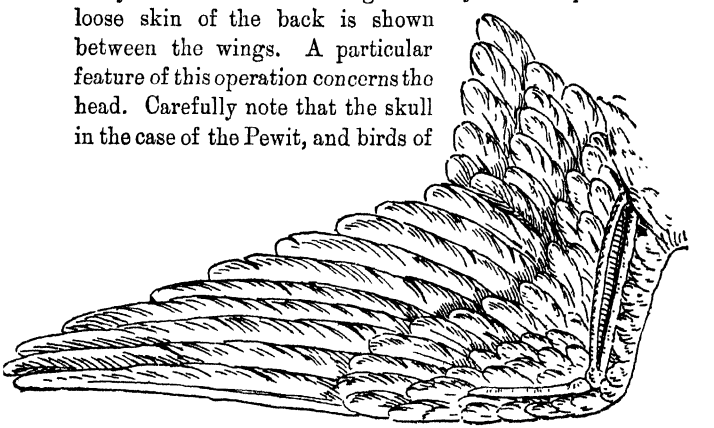
the point of fracture of the *humerus*, and thereupon free the whole body from the skin until only the neck remains to be severed, as shown in the illustration.

The next step is one requiring judgment and dexterity. The head must be got away. With ducks, geese, and similar birds, the head is too large to come through the neck skin, and, in such cases, an opening must be neatly made from the back of the head, about two inches down the neck, of sufficient size to admit of the skull being removed for cleaning. Through this orifice force the skull, skinning it carefully until past the eyes, and in doing this pay particular attention not to work any injury to the edges of the eyes, or to the ears; these last should not be rudely touched by the knife. Cut away the back part of the skull, with neck, tongue, and palate. Remove the brains and the eyes. The whole skin is then in a condition to be cleaned and prepared. The first thing to do now is to take away all fat and flesh, and make your skin as cleanly as you can; then dress the inside with arsenical soap. Bind some tow round the leg-bones where the muscle was, and restore them to their proper position. Put some cotton wool in place of the eyes, and, having forced some of the arsenical soap into the skull, return it to its place. In the case of the large birds—the specimen figured in our illustration is a goose—the wing must be treated thus: Open the skin from the outside along the bones as shown below, removing the muscle, without disturbing



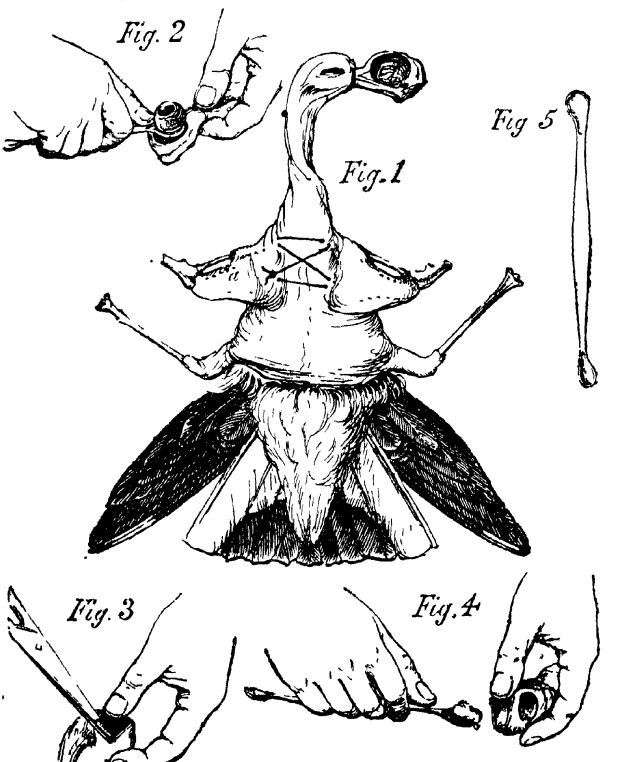
the hold of the feathers on the bone; the quills here join the bone. It is important to bear this in mind, for if a serious error be made here the wing will be shapeless. Small birds can be treated from the inside.

The operations necessary to preparing a Pewit are figured on the block, p. 52. This is the specimen with skin reversed, showing how the flesh can properly be removed from the inside without undue disturbance of the wing feathers from the bone. The flesh is here entirely removed. The stitching necessary to take up the loose skin of the back is shown between the wings. A particular feature of this operation concerns the head. Carefully note that the skull in the case of the Pewit, and birds of



similar anatomical formation, is sufficiently small to pass through the skin of the neck entire without injuring it. The skull of some birds will not allow of this operation, but a nice discrimination will guide the operator to success in the delicate experiment. Fig. 2 shows the method of removing the eye, a "gouging" operation in which the instrument Fig. 5 is employed. Fig. 3 demonstrates how the skull should be cut for removal of the brain; the scissors are employed. Fig. 4 illustrates the removal of the brain with the instrument (Fig. 5) after the skull has been properly severed.

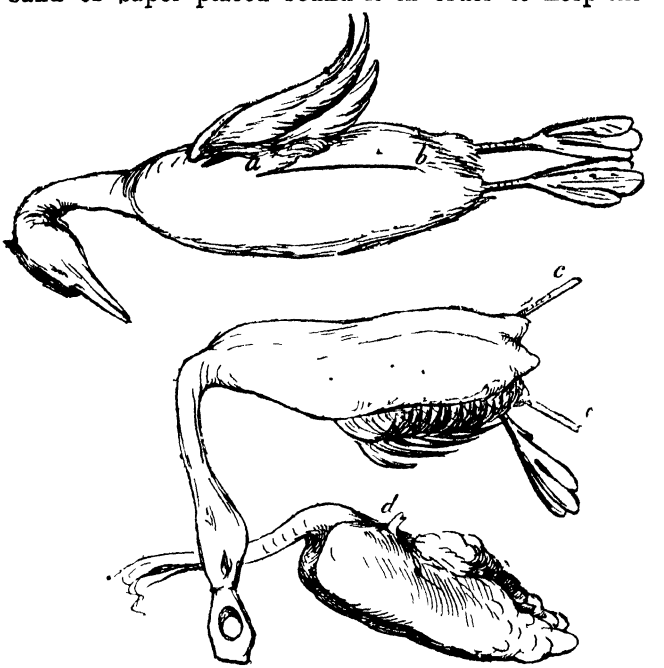
In the case of a Grebe, the feathering of the breast—its principal ornament—is so exceptionally delicate and necessary to be preserved, that particular care is required for the treatment of it. It is better



not to touch it with the knife, but the incision of the skin should be made laterally out of sight, under the wing. The illustration given, p. 53, shows, *a b*, where the cut should be begun and ended. The central figure

presents the skin reversed as taken from the body, *d*; the leg bones, *c c*, and the wing bones protrude.

It is not desirable to use powdered alum to bird-skins, as it tends to make them brittle. The specimen should be filled out by stuffing to the natural size, and a band of paper placed round it in order to keep the



wings and other parts in proper position till dry. During the whole operation, wood-dust, or other dry powder should be freely employed to absorb blood and grease, so that the plumage may be kept clean.

When the skin of a specimen has been taken off in manner set forth above, there is a proceeding which it is important to observe, that is called technically

"making the skin." This is in reality a part of the operation of skinning, indeed that part of it which consists in finishing the work in a workmanlike manner. While the skin is fresh and supple it must be so disposed that as it dries it may take proper form rather than distortion, and much after-trouble will be saved. The skin, as it is inside out, must be cleaned—this is indispensable—and the arsenical soap properly applied. Directly that is done, it is well to sprinkle the surface of the soap with some dry powder—say plaster of Paris, so that in handling the adhesiveness of the paste may not be inconvenient. It will be noticed that the skin between the wings, when raised from the bony structure, exhibits among the quills certain bare places. Now these would be most unsightly if they appeared prominent on the finished specimen. The tendency of the hollow skin, at this part especially, is to be too large, and it is better for after-operations that the skin should rather be contracted than expanded to anything approaching looseness. In setting up the bird, it is far easier to stretch the skin, if required, than to contract it; and now is the time to catch up and stow away any seemingly superfluous folds. These are most conspicuous on the back. To get rid of them, tie the wing-bones inside with a thread that shall lie across the back, and draw the wings together as near as in judgment they may best represent the position in life. This will enable the feathers to cover in the naked skin, that would otherwise appear, and will give solidity, so to speak, to the plumage at this part. This is little present trouble, but is the saving of infinite trouble in the future, and is of great consequence for the beauty of the bird. Having done this, turn the plumage out, but be careful in doing so

not to fracture the skin of the neck. Use the scissor-forceps to fill in the neck with cut tow; fill in the body; smooth the feathers into proper position, and your whole bird into proper shape. Place a paper band round the wings, that they may set in good position. Small birds can conveniently be slipped into a cone of paper.

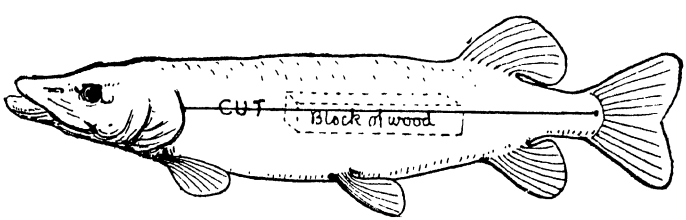
It may sometimes fall to the lot of the traveller to secure an Albatross, and at the same time he may not always know what to do best with his unwieldy and not very rare specimen. If he does not care to preserve it whole, he may well be reminded that there are some parts of it which may be profitably saved. The long tubular wing-bones are prized for pipe-stems, to which they can be adapted well; the great web-feet will make beautiful tobacco pouches when properly prepared, or a curious small work-bag for a lady can be formed of the same trophies. The wing-bones must be carefully cleaned: a good way is to open the orifice at each end, and boil them; or they can be macerated in water. The foot should be treated thus: sever the bone above the knee; cut the skin down the back of the shank and heel; insert the thumb and finger—you must not use any sharp instrument—so as to separate the web on both sides from the bony structure of the toes; do this down to the outer talons, and so that the toes can be drawn out of the web-pouch now formed; sever the talons from the bones on the inside with the scissors, leaving the talons attached outside; clean the skin neatly, and dress it well with arsenical paste; fill the pouch with wool, or tow, or sawdust, to keep it in shape. Of course the utilisation of parts of birds and animals in this way is mainly a question of inventiveness and

ingenuity, for many natural features may be adapted to the most useful and ornamental purposes, while at the same time they retain the character of trophies. The leg-bones of the Flamingo are long and have an elegant curve—they will form admirable pipe-stems; the teeth of animals can be adapted ornamentally in many ways; the talons of a tiger, or the hoof of an antelope, or the tusk of a boar, may, as well as antlers and more pretentious features, be employed for adornment or use; and there is just this advantage, that they may in some circumstances be saved, when the whole trophy has to be abandoned.

Birds can be kept in spirit, and this mode is particularly useful for the preservation of young birds in the down, very small specimens, etc.

Reptiles and Fish.—As a general rule large specimens are skinned and preserved in similar manner to birds, although with reptiles alum may be used, especially on the thicker portions of the skin; but small specimens are kept in spirit. It must rest with the traveller himself to determine which course is best for saving the particular example he has secured. When a fish is skinned whole, he must be laid out carefully on a board, and the incision must be made not down the belly but along the centre of the least important side, from gill to tail. The object is to remove the body from the skin, with the least possible disturbance of the scales, etc. The skin can be manipulated neatly from each side of the incision. When, in this operation, you come to the base of fins, cut the obstruction inside the skin with the scissors, but with judgment, so as not to sever them too closely, that they may not be unsettled. Cut in like manner the *vertebræ* next the base of the head, and next the extremity of the

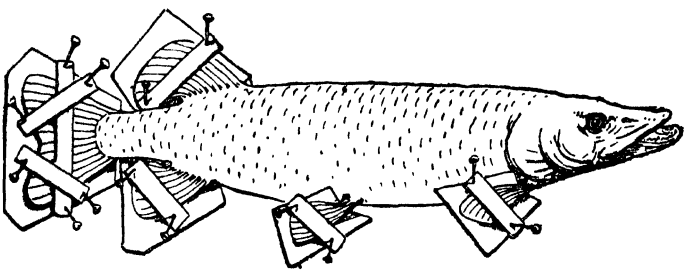
tail; then, if need be, cut them also in the middle so that the flesh may be taken away in two pieces; but this is a matter of convenience, and must be made to subserve the all-important point of not disturbing, bending, or otherwise injuring the skin, for the scales that constitute the characteristic beauty to be preserved are very fragile and easily detached, and to break or detach them is fatal to the value of the specimen. Clean the head as well as you can, and then paint the whole interior surface of the skin with arsenical paste and apply the same preservative to the



head, into the cavities of which cotton wool may be pushed. The body should be filled with dry sawdust up to its natural shape; next draw the edges of the orifice together with neat stitches. The fins and tail must then be treated. These, while wet and pliant, must be set out in natural form on pieces of card, so that they may dry as they are intended to be displayed. The specimen can now be put on one side to dry.

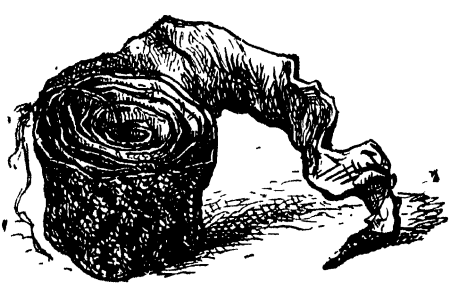
This process, however, rather presupposes the opportunity for quiet treatment at home. When the naturalist is on the field, shorter means may be used. The skin being removed and dressed with arsenical

soap, may be left to dry in convenient form. The skins can then be packed together, and it will be found useful to pack with them some light stiff material like thin wood, dried rushes, etc., that dis-



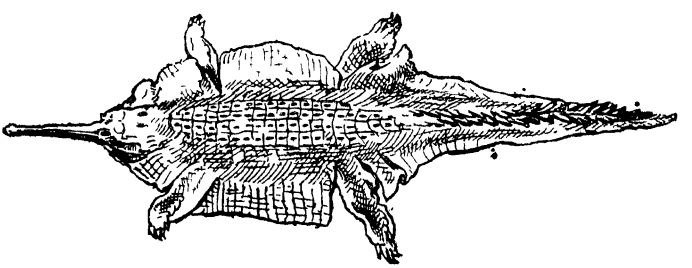
posed longitudinally will prevent the possibility of the brittle skins being bent accidentally.

In skinning large snakes, the body being removed,



the skin, properly treated with preservative, can be conveniently folded like a ribbon round the head, until it forms a small portable bale of similar form to that figured in the illustration.

The smaller fish and reptiles, when preserved in spirit, should be saved in form as uninjured as possible. Carefully preserve the natural appearance of the creature so far as may be; and it is very important that on a label (of tinfoil or paper) attached to the specimen itself, or to the receptacle wherein it is placed, should be noted a sufficient description of it made at the moment it is fresh before you, especially of colours and appearances and features which may disappear or be altered by the spirit, unless the species

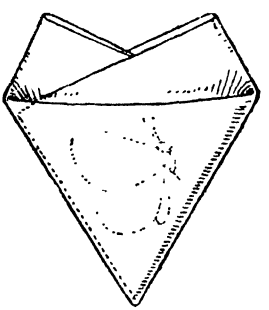


be quite well known and these details are manifestly unnecessary. Be particular as to the locality in which the specimen has been captured.

INSECTS.—The ingenuity displayed by the collector in capturing and storing insects is often a personal quality, and the methods that may be adopted are almost infinite. The general methods most approved are all that can be referred to here. Butterflies, moths, and some other species, whose beauty is in their colouring and is very fragile to the touch, must be treated for storage and preservation in a different

way from beetles and insects of similar class. In fact, all excepting the first named may be preserved in spirit so soon as captured for after treatment, and they need not be injured by the process. For permanent display in the cabinet, all insects must be properly set out—the *Lepidoptera* with distended wings, and the Coleopterous insects in suitable position. They should be killed the instant they are captured, to prevent injury resulting from efforts to escape. A gauze net is generally used. When a butterfly is got into it, the collector watches his opportunity while the insect is still in the gauze, and so soon as it closes its wings he lightly and sufficiently pinches its thorax between his thumb and finger. The butterfly falls from the net dead and uninjured. The specimen must not be handled excepting to pick him up by the legs, holding which the wings may be slightly blown apart and a proper pin pushed through the body, so that the specimen with closed wings may at once be stored in the collecting box, or if the creature be not quite dead the pin can be inserted on the under part of the cork in the cyanide bottle, and the specimen kept there till dead. Butterflies should be stored thus with folded wings, until they are required to be set out for the cabinet. When the collector reaches home, he can store the contents of his pocket box, by putting each specimen in a small triangular envelope of paper, outside which a note may be made. Hundreds can be stored in small space. Moths, on account of their greater rotundity, must not be treated in exactly the same manner by pinching. They are not frequently captured in the gauze, and are best killed in the cyanide bottle, or by the application of a little prussic acid. They are conveniently

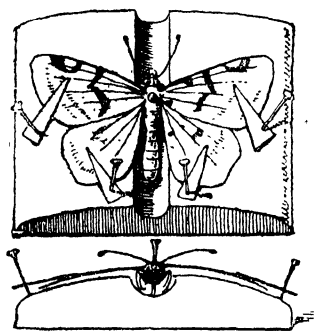
taken home in separate pill-boxes. Beetles, etc., may as a rule be well preserved in spirit, which kills them forthwith; or they can be killed in the cyanide bottle. When the time arrives for arranging insects for the cabinet, the Butterflies can be relaxed by placing them for a time on wetted sand, or exposing them to steam. The wings, legs, etc., can then easily be set out by the aid of small pieces of card on pins (see p. 62, figs. E, F). Beetles, etc., should be set out while they are wet when taken from the spirit (see p. 27 as to preservatives).



In England, and on the Continent of Europe, many entomologists now study the exotic species, which they can obtain from friends or correspondents residing abroad, either in the *ovum* or egg state, or in the chrysalis or pupa state. Most people know that from the eggs (*ova*) of Butterflies and Moths come out caterpillars or *larvæ*. These *larvæ* moult several times, and after each moult, in some species, there is a remarkable change in the colour of the *larva*. The *larvæ* of many species of *Lepidoptera* go into the ground to change into the *pupa* state, and sometimes they form a shell in the ground; some turn into *pupæ*

in leaves, others on the ground in a sort of web. The *pupæ* of Butterflies are most often found on grasses, twigs of shrubs, or on trees; others on walls or fences.

The *pupæ* of many species of *Bombyces* are inclosed in cocoons most often found on trunks, and especially on branches of trees. Some of these cocoons are remarkable by their size and the beauty of their silk. When the leaves of the trees have fallen, these cocoons are easily seen hanging from the branches.



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In some species of *Lepidoptera*, the *imagines* (perfect insects), male and female, are very much alike, but the body of the ♂ is larger than that of the ♀. The Moths of the male *Bombyces* have *antennæ* (horns) very much more pectinated than those of the female; the body of the latter also is generally much larger. Persons wishing to rear the *larvæ* should keep the Moths in cages, in order that the eggs may be secured.

With respect to the rearing of the *larvæ* of large *Bombyces*, the following plan may be adopted, till the second or third stage. Use large bell-glasses, with a

few holes in the dome, or glasses open at the top, which in this case must be covered with gauze. Place these glasses on saucers full of sand covered with a piece of paper. Through the paper stick into the sand some branches of the food plants proper to each species. Place the young *larvæ* on these. Under bell-glasses, which, of course, must be placed in the shade, no water is required to keep the little branches fresh, and the young *larvæ*, which are apt to wander till the first or second moult, cannot escape. When the *larvæ* are large, it is best to rear them on large branches plunged in water, and without the glass covering. This refers to the rearing of the large silk-producing *Bombyces*, and of all those forming some sort of cocoon. When the *larvæ* have to bury themselves to change into *pupæ*, it is of course necessary to rear them in a box, containing a few inches of mould. This method should always be adopted when the habit of the *larvæ* is not known. Breeding cages, which, as a rule, should always be large, must have their sides of perforated zinc to give air. Cages ought to open by the middle, like two boxes open on one side, and placed one over the other, and fastened by hinges.

When *pupæ* have to be sent to England from very distant countries, especially if they have to cross the tropics, they can be conveniently transmitted in small strong boxes by sample post; each box not to exceed eight ounces, and to be registered, but place the stamp where the stamping will do no harm. The *pupæ* should be sent as soon as they are formed; and if underground *pupæ* they should be placed in soft damp moss. The boxes should also have a few holes in the sides to admit air.

If boxes containing *pupæ* or *ova* of *Lepidoptera*

could be placed in the ice-house on board ship, which would retard considerably the emergence of the Butterflies or Moths and the hatching of the eggs, valuable species could be sent from very distant countries. Salmon *ova* were thus safely forwarded from England to Australia and Tasmania.

ARTISTIC SETTING-UP OF TROPHIES.

In order to reproduce the life-like form of any animal by the employment of its preserved natural features, not only technical skill, but knowledge and artistic feeling are necessary to the production of a worthy work. Formerly, the process aptly termed "stuffing" was employed. The results were seldom or never of more that a relative value, especially in regard to the mammalia. The fact was too often ignored that the use of astringents, necessary to preserve a skin, invariably distort it, that this distortion differs even in several parts of the same skin, by reason of the varying thickness or even the condition of health in which the animal was killed; for instance, the skin of a fat animal is liable to undue expansion, that of a poor beast, to peculiar contraction; and mere stuffing can give only an untrue representation of the living creature. It is therefore incumbent upon the operator, firstly, to make himself thoroughly acquainted with the habits of the animal in a state of nature; and next to choose some incident of the creature's living existence which he desires his specimen to illustrate. This will enable him to arrive at his design. He must then make himself acquainted not only with the bony but the muscular structure of the animal, by which

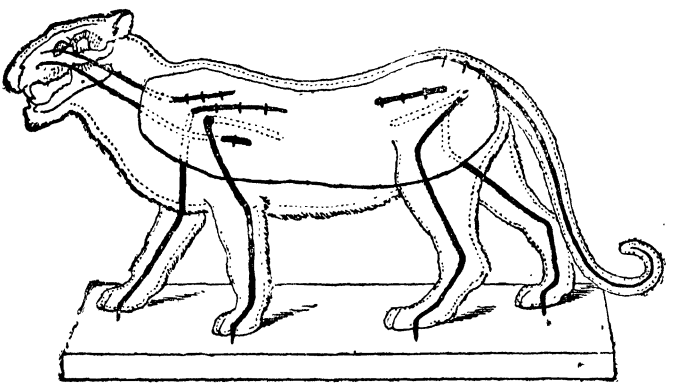
knowledge he can, if he have the proper technical and artistic skill, produce a *model*, whereon he can properly place the skin and other natural features of the specimen, so as to make as perfect a representation as practicable of the living animal, in form and detail, and of the creature's living habits in his design. This is the only course whereby noble trophies can be made to have more value than a paper description of them would possess. On the individual skill, knowledge, and taste of the artist depends the real value of the work,—in the same way as that of the sculptor, or painter, is in degree to be estimated.

A typical animal to illustrate the propositions laid down above is the Tiger, because of his various and picturesque habits, his magnificent proportions, and great beauty. I shall, therefore, describe the setting-up of a specimen of this feline in detail. But here a qualifying observation must be made. No book description can adequately convey all that should be known. To learn what is necessary the personal instruction of a good teacher, and the smallest modicum of experience, is worth more than any printed course of instruction, however ostensibly complete. We will, then, suppose that a perfect skin, in good condition, has been procured. Let us select the simplest action of the creature, viz. his stealthy walk through a grassy jungle, which is his habitat, when his peculiar expression is that of constant caution, whether he be in retreat, or advancing, with the snarl of ready offence which is habitual with him. This is the design. As digitigrade quadrupeds, the cats walk on their toes, and the claws then being retractile are concealed. The left hind leg and the right fore leg, or *vice versâ*, are used together in progression. There is a difference in

the pose of the ear to express alertness, caution, or anger. In the first case the ear is erected; the ear is partially depressed when the beast is only cautious, but in anger, or incipient anger and alarm, the ear is levelled with the skin of the head. We will choose the semi-depression. The mouth should be partially open, showing the teeth and tongue, but the lip not raised, the expression being that of slightly panting. In order to produce this design, first study the skin and form a judgment of its natural dimensions, as to height, bulk, etc. A distinct preparation of the skin is necessary as a preliminary to this. It must be what is technically called "shaved" or "fleshed." This process consists in first softening the raw skin—which is most often native-dressed with lime—by sponging the flesh plentifully with liquor. The skin is then placed on a rounded beam conveniently, and what is termed the "pelt"—the *enderma,* in fact—is removed, by scraping and shaving, with a currier's knife, the edge of which is turned peculiarly for the purpose. This, in reducing the substance of the skin, renders it elastic and better adapted for use on the model, which must be now constructed. The head, with the lips, eyes, and burrs of the ears, as well as the feet, must be carefully shaved with an ordinary knife, skilfully manipulated. Now fold over the skin with the hair outwards, so that the limbs accord with the intended position; measure the points and make the best estimate possible under the conditions as to bulk, etc. The limbs should be folded and the whole arranged as nearly as may be to give the outline of the animal.

In making the model first deal with the trunk. Two 1½-inch boards, 11 inches wide, of proper length, should be glued, and what carpenters term "dowalled"

together by the edges. Place the skin as folded to represent the animal flat on this board, and from it draw thereon the outline of the trunk. Cut the board to this outline—to the inside of it, so that room be allowed for the modelling of the muscles on this framework. Get four sufficient iron rods—$\frac{5}{8}$-inch is the medium gauge—for the legs, one for the tail, and two to support the head. Bore a hole through the board where the *scapula* or blade-bone would come Through this pass the rod till about 15 inches are on



the other side, then bend this portion sharp round at right angles, to be fastened by staples firmly along the board in the direction of the hind quarter. At about 3 inches from the board bend the rod again, and incline it forward at such an angle as represents the natural position of the *scapula*; then bend the rod back again for the *humerus*, and once more forward for the *ulna* and *radius*, then shortly for the carpal and metacarpal bones. This is the extent of the rod, which must now be taken through a wooden stand and fastened under it. It will be seen that this

iron, which must be repeated exactly on the other side, is intended to take the place of the absent bones, and that it must stand away from the board just such distance as the original bones would have occupied. The hind legs should be treated in similar manner (see diagram). The iron for the tail must be appropriately bent, and attached to the board in position; as also the two irons to support the skull, which must now be attached.

The next operation is to carve in soft wood the bones and muscles of the limbs, keeping them small enough to be finally covered with clay. I use a particular substance of my own invention for this modelling, and it dries as hard as marble without any shrinkage; it is never brittle. The first group, "The Combat," that I was able to produce by this means, was exhibited in the International Exhibition (1871), in Division III. (*Scientific Inventions and New Discoveries.*) The wood, representing bones, should be made in pieces, much as a lay figure is made. The pieces then being sawn through the centre longitudinally, a hollow space should be cut down them, not only to lighten them, but that they may be riveted together over the iron, so that the rod occupies the place, as it were, of marrow in the bone.

The trunk must be built up so as to be light and hollow, but with an appropriate surface to receive the clay. Behind the shoulder, midway, and next the thigh, should be fixed, on either side of the central board, segments of 1-inch board, of proportion sufficient to give the required bulk, and to secure the contour of the ribs, etc. A nearly circular board must be shaped to distend the neck. Across the edges of these boards coarse, strong canvas must be

neatly tacked, small laths being inserted at proper places to prevent the canvas sinking. The rod which is to support the tail must be covered with tow, neatly bound on to the required form, and then in like manner sewn up in the canvas. The same material must also be extended over the skull, whereon the fleshy excrescences must be represented cleverly by tow. We have thus a complete light framework covered with strong canvas, excepting the limbs. On all necessary places over the whole framework a surface of modelling clay is to be worked. The ribs and prominent muscles of the trunk, the muscular development of the shoulders and haunches, the joints and extremities, must all be carefully modelled on. Ordinary modelling clay is used; and when the model is finished, and nearly dry, paper should be pasted over the clay to prevent it from breaking away. A good method is to perfectly steep brown paper in a pailful of hot paste. The softened paper can be put in small pieces over the clay, and readily adheres.

The model is now completed and made ready to receive the natural features of the animal. First of all the eyes must be carefully adjusted in the most natural manner; the claws must be next inserted in position. It remains to place the skin. This must be again damped with liquor till quite soft, and in this state it must be carefully arranged on the model. First manipulate the head, paying particular attention to adjust the lips, eyelids, and ears properly, so that the required expression may be secured. It is advisable now to tack together the edges of the skin in certain places, as under the throat, the four joints under the armpits, and at the groin, midway under the belly, at intervals along the tail and the limbs. Adjust

the soft skin to the inequalities of the model, using a "piercer" and the thumb. The seams must be carefully and neatly sewed up. A delicate and important operation remains. The skin should fit perfectly all the indentations of the model. In order to attain this, the skin, when worked wet into the recess, should be secured there wherever necessary by drawing pins, which must not be withdrawn until the model is perfectly dry. Then, the pins being removed, the fur can be cleansed in the usual way, viz.: rub with the hands very fine mahogany dust all over the coat; then beat it with a fine cane and finish with a brush. The tongue, which is modelled in clay, and tinted, should now be placed in the mouth, where the tinting can be finished. At the same time, the lips, eyes, and nose can be tinted and finished. The pigment used should be the finest tube oil colour. It is best before painting to cover the mucous surfaces with hot wax, which promotes the naturalness of the appearance most materially. The whiskers which may have come from the skin should be carefully replaced.

Accept it as a golden rule never to cut the skin.

The method described above is given on the presupposition that the skin is one as ordinarily received from India, cured by native practitioners. But in cases where the skeleton of a beast is preserved, and is available, much of the work may be saved by utilising the bones, especially for the limbs; and in any case they furnish the true proportions of the animal, which are so difficult for the inexperienced operator to arrive at without them.

The mounting of Head Trophies is best achieved in the following manner: If the head has been received in pickle, the skin should be thoroughly cleansed in

fresh cold water, and should directly afterwards be shaved on the flesh side, as directed in the case of the tiger skin. Whether it be the head of a Tiger, a Stag, or a Bison, the process is the same. A proper estimate must be taken of the length of neck. What is called a neck-board must be prepared accordingly; that is a framework to which the skull is to be attached, and whereon the skin of the neck can be distended properly. This board is a flat piece of inch deal, 11 inches wide, cut to the shape of the neck, as the central board is shaped for the trunk of the tiger. The construction is on the same plan, the form being modelled in like manner. This neck-board is fixed to a heart-shaped back-board, by means of which it can be hung against a wall. The skull and horns having been firmly fixed on the artificial neck, the skin should be placed on the model and carefully adjusted. In well prepared trophies the seam should be up the nape of the neck, and the throat be intact. The nostrils, lips, and eyelids of the Stag, or Bison, should be moulded with artistic feeling and particular care, and clay should be injected between the mucous and outer skin of the lips, nostrils, and eyelids, so as to give them the rotund, fleshy appearance they have in life. It is better to insert the eye in its orbit before the skin is drawn on. The ears must be manipulated into shape while they are drying, and when the specimen is dry it can be cleaned in the usual manner.

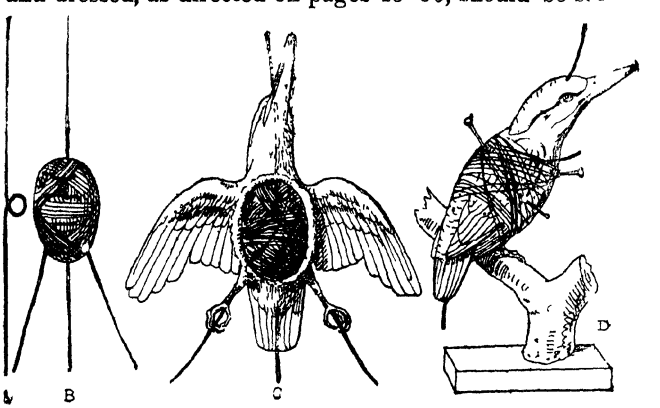
Of small mammals the Squirrel will probably serve best as an example, and in this instance I shall presume that the skin has just been removed from the animal in a fresh condition, according to the method fully described on page 32. It is always an advantage to set up a skin while it is fresh. Prepare a body wire

about 12 inches long, and of the thickness of ordinary whipcord; cover this with tow to the size of the carcase that has been removed, and bind the tow neatly with hemp; in fact, shaping the tow as nearly as possible to represent the form of the squirrel. For a sitting position, bend the wire so that the artificial body have the necessary arch of the back. The end of the wire next the tail must be turned and concealed in the body. Certain stitches through with a long needle will assist materially in shaping the form and strengthening the frame. A wire covered with the requisite quantity of tow will form the tail. Four wires, each about 8 inches long, will be required for the limbs. Pass these wires severally through the fleshy pad of the extremities, and bind the bones to the wire with cotton, taking care to leave about 2 inches of wire beyond the *humerus* and *femur*, so that they may be passed into the frame of the body and clinched. Next fill out each limb by carefully binding tow in proper proportion round the bone. Never exceed the natural size. The bones having been returned to the skin and the limbs completed, the upper end of the body wire should be cut so as to protrude only 1 inch and then should be inserted in the skull, the whole skin meanwhile being turned over the skull. A stitch driven through from eye to eye will fasten the head securely to the artificial neck. Small portions of tow must be inserted where the flesh has been taken from the skull, which can then be returned and the skin drawn into its position. The limb wires can now be inserted in the body and clinched. The skin having been properly drawn over, the parts can be neatly sewed up, the limbs bent to their natural position, and the wires of the feet passed through a stand so as to

be secure. It will be found advisable to manipulate the skin with the "piercer" and thumb, in order neatly to adjust it, and finish the specimen to taste. The eyes should next be inserted by adhesive glue paste. The fur should not be cleaned till the skin is quite dry.

Reptiles may be treated in precisely the same manner.

Birds, when the skin has been properly removed and dressed, as directed on pages 43–56, should be set



up in manner following. For example, a Pheasant, say freshly skinned, should have a similar body wire to that employed for the Squirrel, but proportionately stouter to sustain the extra weight. The leg wires should be half as stout again as the body wire, and should be inserted at the back of the *tarsus* where the tendon runs. The fleshy part of the thigh must be made up in the same manner as directed in the case of the Squirrel, while the body and neck is to be formed on the body wire (see fig. A) in precisely the same way. In the illustration, fig. A is the body wire;

fig. B is the same dressed neatly with tow bound with thread to the size of the bird's body; similar wire must be appropriately dressed for a long-necked bird. With most birds the neck is almost hidden by the feathers; but some species have necks (like the Heron) requiring special treatment. With the last named the substance is formed on the wire. With the first mentioned but little stuffing is needed, and that can be loosely inserted before the wire, which may be pushed through it. One end of this body wire is thrust up the neck and right through the skull, so that it appear right through the top; while the other end is made to protrude from the other extremity to support the tail. The leg wires must be inserted through the sole of the foot and under the skin up the back of the leg where the tendon was, until the pointed wire is worked between the thumb and finger to equal position with the thigh-bone; push this bone with the wire through, bind both with the requisite tow, and draw them back into the skin of the thigh, then continue working the wire on, until it has progressed enough to pierce right through the tow on the body wire. The leg wires must cross, and where they cross in the body they must be firmly twisted together with the pliers, so that the junction is covered by the tow. Much depends on the firmness of this fastening. Next insert such wool as may seem necessary to fill out the breast, and sew the skin neatly up. Dress the feathers smooth and bend your bird into shape, next wire him on to his perch, or other stand, and so you gain use of both hands. Place a short wire through the quills of the tail to spread the feathers. Set the wings into position with wires, and insert a pin wire into the back, another into the breast; then, by means of these,

lightly baste the specimen with cotton so that the feathers may dry in proper position. The symmetry and natural pose of the specimen should be a matter of most careful study. No amount of technical skill, or of imaginative power, will in the least compensate truly for the knowledge of nature. To have seen the bird healthy in his natural habitat, and to be able to reproduce his natural behaviour and appearance, is an inestimable advantage. We cannot all of us command that; but we can do the next best thing, rely on the information communicated by others who have. My late father, when travelling with Audubon, accumulated an inestimably valuable store of such information; for it was the invariable practice of that great naturalist directly a specimen was secured, and before any treatment of it, to have a sketch made of it, in the carefully observed natural position of life, with record of all colours and contiguous, or surrounding, natural features. Nothing is worse than to give a pretended character to a specimen, or to mount it with details that are anachronisms—such as to put ferns and grasses with birds who never existed where such ferns or grasses grew; or, to put seaweeds with creatures who do not frequent the ocean or sea-shore. The true sportsman-naturalist should esteem the record of an animal's pose or habits in life as important as any other record, so that when the specimen comes to skilled treatment, the naturalness of it may be a feature that enhances its value in every way. The line of form in many animals is not given by the skin, but by the fur, or feathers, as the case may be. He spoils a restored specimen who destroys this character by too much smoothing. By the eye and erection

of the fur, the expression of anger is given. Some birds have the power of erecting their feathers, their crests, or position of their plumage, in token of passion, or for purposes of cleaning their plumes, as when a Pelican emerges from the water; and all character is destroyed by the misapplication of neatness, by too much tying down of feathers, or purposeless stroking of the fur. A test of proper treatment is the setting-up of the neck. Too frequently the neck is quite distorted by the stuffing, and elongated out of all proportion in the finish. The carriage of the head in nature is of paramount expression. When a bird is dead the muscles of the neck become flaccid, and the neck seems to be longer. This tendency is often aggravated by unskilful treatment of the skin, and destructive disproportion may result. It is a fault to guard against, and an arrangement to be carefully achieved. For instance, a Duck, sitting on the water, shows but little length of neck; sometimes, when at rest, hardly any; but the same bird in flight shows a long neck. Some knowledge of drawing and of modelling, seems to me to be essential to artistic setting-up of animals; and the best of specimens, inartistically mounted, are relatively worthless.

All the wire used for these operations should be annealed iron wire.

The dried skins of foreign birds must be softened and thoroughly relaxed before being manipulated for setting up. This is best effected by placing the specimen in a closed box, on wetted white sand, covered by paper, so that the evaporation may penetrate it. The duration of this process must be determined by the size of the bird; one night is sufficient for small

skins. The necessary stretching of the shoulders and other folded parts must be effected carefully, so as to assimilate the specimen to a green skin.

The grouping and "fitting-up," as the ornamentation is technically called, of specimens is an important point, and one the careful attention to which greatly enhances their value even in a museum, where such work is not ordinarily employed. Such addition to the naturalness of the subject often affords opportunity of, by little things, illustrating the habits and habitat of the animals. To take a pheasant, for example: Having set up the specimen, if it is intended to cover it by a glass case, a few natural ferns, suitable to the habitat of the bird, should be dried, and the faded colour restored, where necessary, by tinting with oil pigment. Grasses should be treated in the same way. The surface of the structure on which the bird is mounted—or, in other words, the ground—should be formed of calico, tacked with taste over a wooden framework to assume the required forms. It should then be covered with small pieces of brown paper that have been well soaked and softened in a mixture of glue and whiting. A few loose stones and portions of sand will readily adhere to this surface, and give the required reality of appearance. But it is necessary that these should not be applied until the surface is sufficiently hardened to receive them without being injured. An old root, pieces of lichen, and similar features can be introduced according to taste, so that they be accurately employed. The whole production must be painted with care, wherever painting may be necessary, so as to reproduce naturalness in the greatest perfection.

It is essential that the plumage of birds should be

quite clean and as perfect as possible before the specimen is mounted. The best way of removing blood stains or other impurities from feathers is as follows: Dissolve a piece of pure pipeclay, about the size of a walnut, in a short pint of warm water, then with a portion of fine flannel steeped in this liquid, and soaped thoroughly with best yellow soap, saturate and rub the feather the right way; having done this sufficiently, immerse the feather, or the bird-skin, in clear cold water till it is cleansed, then roll it in a dry cloth, which, when duly pressed, will absorb the water. Having done this, hold the specimen within the heat of a fire, all the while beating it briskly and lightly with the folded end of a clean towel. In the case of detached feathers, they can be waved rapidly, or swung round at the end of a string, before the fire. Under this process plumage will resume its perfect order. This is by far the most effective as well as simplest operation of the kind, surpassing the employment of spirit and plaster of Paris, salts of sorrel, blue water, etc.

A method of treating fish trophies must be mentioned here as being frequently more convenient, in certain circumstances, than the skinning of them, and at the same time sufficiently efficacious for the purpose. This is to cast the specimen in plaster of Paris; and, whether we care to complete the cast with imitative colouring, or simply to preserve it in white, accuracy of form is at least obtained. A mould must be made. Most fish are more or less covered with a transparent slime, which, for purposes of casting, would obscure the small indications of form, such as scales, etc. This coating must be got away. To effect this, lightly sponge the specimen with dilute vitriol, which will

have the effect of changing the slime into an opaque film, which can be removed almost like a skin. The fish must then be carefully posed in position, on its side, and all those portions underneath the specimen where the plaster would penetrate should be filled in with clay; this, indeed, should form a bed for the fish, whose fins should be displayed on the surface by being impressed into it by means of the thumb. The plaster must be carefully prepared: put some water in a vessel and lightly shake the plaster, with the fingers, into it—not pour the water on to the plaster. The first batch should be very limpid, but little thicker than milk; it thickens rapidly as it stands. Pour this limpid plaster over the specimen—skilfully, so that each portion be well covered, and all the interstices filled with a first film of white. Directly this is set, put on a second coating of thicker plaster, and so on till the mould is thick enough; shape it at last roughly with the fingers. When dry, or rather quite hard, turn the mould over, pick out the clay, take out the fish, and the mould will be fit for use. This is what is called a "waste" mould, and the reason will be readily seen. The cast is produced by substituting plaster in place of the fish, thus: First dip the mould, if space admit of it, into clear cold water, so that the inner surface become thoroughly saturated; or, if the mould be too large to immerse it, wash the inside lightly over with sufficient clay-water, that is, water coloured with modelling clay; the object being by saturation to prevent all absorption on the inner surfaces. If the mould have been preserved till it is dry, an application of boiled oil will have the same effect. The plaster to be inserted must be skilfully mixed, at first quite limpid, and this must be washed

into the mould so as to fill all interstices, without any bladders or bubbles appearing as this first coating sets. A second coating strengthens the first, and so on; but there is no occasion to make the object solid, although the walls of the cast must be in all places of sufficient thickness. When the plaster is well set hard, the next process is to chip away the mould from the cast, and the mould is therefore called "waste." This requires skill in the application of sufficient, but not too much strength. It is a convenient resource to put a little tint into the plaster of the mould so that it may be clearly distinguishable from the cast when we come to chip it away. The cast when cleared should present all details of the specimen perfectly. When a number of copies of the cast is required it is necessary to make a "piece-mould"—a much more complex operation. It is a mould that is made on the object, in pieces that fit perfectly together and can be removed one by one from the cast, and replaced in position for each cast. It is necessary to make such a mould on a cast, because the yielding nature of the fish would bring about a distortion of parts in a piece-mould; therefore a waste-mould must be employed in the first operation. The piece-mould exercises the skill of the operator and his judgment. No explanation of the process could teach it so readily as the examination of the thing itself, and an old piece-mould can easily be obtained in London, or similar cities, and this resource of casting is not likely to be employed where such a thing is not obtainable.

SKIN DRESSING.—It is a standing difficulty with many sportsmen how best to prepare the skins of animals, so as to make of them the supple and beautiful leather that leaves the hands of the professional

furrier; and thus to make the skins available for wearing apparel, rugs, etc., worked according to taste. The right way to proceed is the following: Let us suppose the subject to be the dried skin of an Indian Leopard. The skin must first be sponged on the flesh side with "liquor" till it is softened, and then it must be properly "shaved." It must then be partially dried. When in this condition the skin should be folded with the hair inwards, and the edges should be fastened together with stitches at intervals of about 12 inches. The object of this is, that the operator may subject the flesh side to the action of grease. For a Leopard, about 3 lbs. of lard will be required; this is the proper grease: butter turns rancid in the skin, and therefore must not be used. The usual mode is to put the skin into a clean tub with the grease, and to tread or knead it with the naked feet, till the action and the natural heat have caused the fat sufficiently and equally to penetrate the fibre of the pelt. The skin may then be laid open and "shaved" a little thinner on the flesh side. The next operation is to clean the fur. To do this, place the skin on a bench with the hair uppermost, and cover it well with fine mahogany dust procured from a veneer mill. Rub this powder with the hand well into the fur, so that it absorb all the grease, and at the same time it will cleanse the coat; and after the skin has been sharply beaten with light canes until the dust has all been removed, the natural brilliancy of the specimen will be restored. A process perhaps more convenient to many persons, but not so effectual, is to rub the grease in with the hand.

HUNTING FIELDS OF THE WORLD.

FOLLOWING are memoranda concerning some of the principal regions of the world which can be resorted to for big game, and where natural historical trophies of interest and value may be collected with advantage, while noble sport is pursued. It must, however, be borne in mind, that in almost every sparsely peopled country, and in many untrodden districts and islands not alluded to here, the study of natural history can be followed by collecting examples, or even specimens of new species and varieties, with absorbing interest and to the aggrandisement of science. The range of such fields is almost inexhaustible: and it includes countries, the fauna and other natural productions of which are imperfectly known to European naturalists, because (as may be said of the Chinese empire), they have been hitherto almost unvisited by them in a scientific sense. No attempt is made to give anything like a complete list of the animals to be found in any particular resort, but simply to supply some information of those most likely to be encountered, which may serve as an indication to the enterprising hunter.

SCANDINAVIA AND THE NORTH.—The accessibility of these grounds from England, the general healthiness

of the climate, and certain conveniences of transit, etc., which can be commanded, recommend them. In Denmark Proper there are none of the larger or important *carnivora*. Sweden and Norway, however, which occupy the peninsula, in their great mountains and forests afford retreat for several animals of interest, as well as for numberless game and raptorial birds. There are many water-fowl. In fact, this is a breeding-ground for hosts of the European birds, who migrate thence, and are familiar elsewhere at certain seasons. The fishing, both freshwater and marine, is very good, especially for salmon. Many of the best salmon rivers in Norway are now leased to English sportsmen. Snow covers the ground during seven months of the year, and this gives a peculiar character to much of the sport. Formerly the predatory animals were very numerous and destructive; they are plentiful still, but are now confined principally to the northern forests and the mountains.* The inhabitants of infested districts protect their cattle by general hunts or battues, and by many ingenious systems of snaring. The Brown Bear (*Ursus Arctos*), the largest and most formidable of the Scandinavian *carnivora*, is seldom encountered save in Dalecarlia and the northern parts of the peninsula. This animal grows till he is twenty years old, and is sometimes found of great size and strength, weighing four or five hundredweight. Wolves are to be found in plenty; the Glutton, or Wolverine (*Ursus gulo*, Linn.), can be got in the forests

* A Swedish Government return shows that in 1827, throughout thirty-four provinces, there were killed by beasts of prey, 35,548 head of horses, horned cattle, sheep, goats, pigs, etc., belonging to farmers; and the estimated loss from this cause was in that year £15,000.

of Dalecarlia, and more plentifully among the Lapland Alps farther north. Badgers. Foxes can be met with all over Scandinavia—the red, the black occasionally, and the Arctic white, mostly in the extreme north. There are, besides, Lynx, Marten, Weasel, Polecat, Ermine, Otter, etc. The noblest of the animals is probably the Elk, the largest of the *Cervidæ*; but, although protected, they are getting rare. In the province of Scania they were once numerous, but have now quite disappeared from there. The Reindeer is in like manner becoming scarcer, save in a domesticated condition; but these noble creatures may be still found wild in the Dalecarlian and Koelen mountains. There are also Red Deer and Roebuck. Of raptorial birds, the Golden Eagle will be found; and in Sweden only (and even there it has become scarce), the Great Bustard (*Otis tarda*, Linn.), the largest of European *Aves*. It used at one time to be common in Scania. It is sometimes, however, seen in Denmark. The Great Horned Owl (*Strix bubo*), and at the extreme north, in Lapland, the large Owl (*Strix Lapponica*), are to be found, as well as the Snowy Owl (*Strix nyclea*). The game birds are fine and plentiful. This is the head-quarters of the grouse genus. First among these is the Capercali, or Capercailzie (*Tetrao Urogallus*), the largest of the European *Gallinæ*. He is to be found in all the woods; in fact, wherever the pine tree flourishes, but best in the hilly districts. Those of the south weigh sometimes 16 lbs. or more; those captured in the north not so much. Blackcock (*Tetrao perdrix*, Linn.) are more numerous than the Capercali. Hazel-grouse (*Tetrao Bonasia*, Linn.) are abundant in the woods and on the hills of the northern parts. Ripas, both of the valley and

mountain species; the Dal Ripa (*Tetrao lagopus*, Linn.), mostly in the northern wooded districts and on the islands; and the Alpine Ripa (*Lagopus Alpina*)—by some considered identical with the Scottish Ptarmigan—which is mostly found on the Alpine ranges and on the Norwegian islands; it haunts stone and shingle. The common Partridge (*Perdix cinera*) is not very plentiful. The Quail (*Perdix coturnix*) is to be met with, but not numerously; it is migratory and rare, especially in Sweden; there are a few in Norway. The Woodcock (*Scolopax rusticula*, Linn.) is scarce, and getting scarcer; these birds, however, are to be met in considerable numbers, sometimes on the western coasts at spring and fall; there are also Snipe, etc. Aquatic birds are wondrously plentiful on all the lakes and rivers. Fine shooting of this description is to be had in almost any part of Sweden or Norway; but the best is probably at Nordholm. Sport is good, too, on the Skärgard, or belt of islands. Of the swimmers, the principal are—Swan, Goose, Goosander, Merganser, Mallard, Teal, Golden Eye, Tufted Duck, Widgeon, Long-tailed Hareld (*Harelda glacialis*), Black-throated Diver, Red-throated Diver, Great Black-backed Gull, Common Gull, Black Tern, and Caspian Tern, etc. The scarce Steller's Western Duck (*Anas dispar*) may be encountered, and should be carefully looked for as a prize. Eider Duck is found on the western coasts.

In the Arctic Sea.—Proceeding farther north, remarkable sport is to be obtained amid the ice of the Arctic Sea, by Spitzbergen, near Deeva Bay and among the Thousand Islands, commencing in July. Walrus or Sea Horse, and several species of the valuable fur-bearing as well as common hair seals will

be met with. They must be harpooned as well as shot; they are seldom killed by the gun unless they are hit in the brain, which is at the back of what appears as their head. Polar Bears (*Thalarctos maritimus*) may be encountered here. Polar Foxes and Reindeer can be collected on shore. The Bears are often of prodigious size and strength, sometimes, say, 8 ft. in length, 4 ft. 6 in. high at shoulder, and weighing 1200 lbs. or more. Many large cetaceans are in the sea; and sea-fowl are numerous.

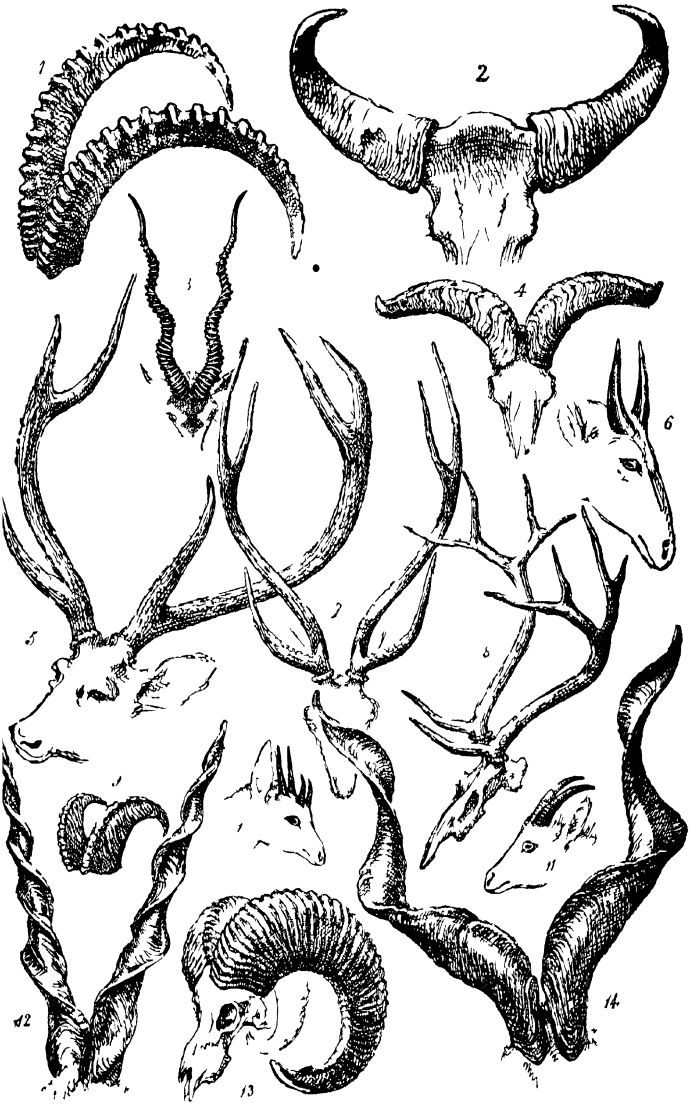
RUSSIA.—Most of the species of animals and birds inhabiting Sweden and Norway will be found in northern Russia and Siberia; indeed, it may be said that in some part or other of this vast empire all, or nearly all the wild creatures native to Europe may be found. Besides the great Brown Bear (*Ursus Arctos*), another, the Siberian Bear (*Ursus collaris*), is to be met with; the Musk Ox (*Ovibos Moschatus*) in the high latitudes; and in the forest of Bialowicza, in Lithuania, to the eastward of the Baltic, the mighty Aurochs (*Bison priscus*), the ancient European Bison of the Pliocene period. This last named wild bull, one of the noblest of animals, more than 6 ft. high at the shoulders, is very rarely to be got at, and is rapidly becoming extinct. It is closely protected and preserved for the private sport of the Czar and the Imperial family. It exists also in certain districts of Moldavia and Wallachia, and is found sparsely in some parts of the Caucasus. There are plenty of Wolf, Fox, Lynx, Otter, Sable, and other fur-bearing animals. Of birds, there are several species of Eagles and other *Raptores* not met with in Sweden and Norway.

THE MEDITERRANEAN AND ADRIATIC.—Particularly for those who possess yachting advantages, the Medi-

terranean coasts and islands, as well as Dalmatia and Albania on the Adriatic, offer pleasant opportunities of sport, especially in regard to birds. Of mammals, the most notable is the Moufflon Sheep (*Ovis musimon*), to be had in the islands of Corsica, Sardinia, and (not so numerously) in Cyprus. The species in Sardinia is most esteemed by some hunters, as the ewes there are generally horned. In Corsica are plenty of wild Hogs, Stags, etc.; but in Greece and Turkey, as well as on the islands, there are many other mammalia of ordinary species. On the African coast, the Bush Goat or Barbary Deer (*Cervus Barbarus*) can be collected. Albania is a principal resort. The birds, especially waders and swimmers, are plentiful there and in many other parts. Some of the most noticeable are the following:—The Balearic Crane (*Balearica pavonina*), getting scarce; Rosy Flamingo (*Phœnicopterus ruber*, Linn.); Purple Waterhen; plenty of Snipe, Heron, Bittern, and other waders; Audouin's Gull, mostly about Corsica and Sicily; White-eyed Gull, among the Grecian Islands; Slender-billed Gull (*Larus tenuirostris*), especially on the African coasts; the Black-headed Gull is to be found in these seas, and especially in the marshes of Albania and Dalmatia, where it breeds. The Great Black-headed Gull, from the Caspian and Red Seas, is seen occasionally about the Ionian Islands; the Algerian Cinereous Shearwater (*Puffinus cinereus*, Cuv.). Sometimes, but rarely, and in hard weather, the Snow Goose comes from Northern Asia and America; and the Blue-winged Goose and the Little White-fronted Goose are found in Greece. The rare Marbled Duck can be got in Sardinia, and near Tunis in January and February; and it has been seen in the Ionian Islands. There

INDIA.

1. Ibex. *Capra Sibirica.*
2. Gaur (Indian Bison). *Bos Gaurus.*
3. Sasin—Indian Antelope (Black Buck). *Antilope Bezoartica.*
4. Burrell. *Ovis Nahura.*
5. Sambur. *Rusa Aristotelis.*
6. Nylgau. *Portax Tragocamelus.*
7. Axis. *Axis maculata.*
8. Barasingha—Swamp Deer. *Rucervus Duvaucellii.*
9. Tehr, or Jhâral. *Hemitragus Jemlaicus.*
10. Four-horned Antelope. *Tetraceros quadricornis.*
11. Serow. *Nemorhædus Bubalinus.*
12. Markhor (Trans-Indus). *Capra Jerdoni.*
13. *Ovis Ammon.*
14. Markhor. *Capra megaceros.* (This one has a white beard. It is rarer than that in the Trans-Indus habitats.)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are plenty of Cormorants. The White and the Dalmatian Pelicans can be found all about Greece and the Ionian Islands, on the borders of lakes and rivers and in the swampy parts. There are many fine species of the *Falconidæ* to be collected. Francolin Partridge (*Tetrao francolinus*, Linn.) are to be had in the Grecian Archipelago, Turkey, Sicily, Malta, etc.; and the *Perdix rufa*. The Greek Partridge is getting scarce. The perching-birds are not greatly dissimilar to the other European species; but among them may be pointed out the Hoopoe, the Roller, the Golden Oriole, and the Bee-eater.

ASIA.—The continent of Asia, of all divisions of the globe, produces the most highly-developed forms of the mammalia: nearly all of the higher animals are to be met with there; some are exclusively to be found there. In the southern countries especially, and in the islands of the Great Archipelago, toward Australia, are some of the most remarkable hunting grounds in the world.

INDIA.—This is perhaps the best field; and, because of the conditions of the British occupation, grand sport can be had with reasonable convenience. Hunting is an acknowledged resource, and means are attainable in most places for pursuing it with success. In Northern India the Himalayas divide Tibet from the great plain of the Ganges. This range, because of its very extent and the vastness of its features, is still imperfectly explored. By reason of its position and the great altitude of its mountains, it presents different conditions of climate, with vegetation and fauna varying in the most interesting ratio. Indeed, a double fauna may be traced in these regions, namely, that which is common to certain divisions of the mountains, and to

Tibet and Northern Asia; and that which is common to these hills, and the hilly regions of Assam and Burmah, which are to the south of the eastern extremity of this chain. Thus the variety of the game is most remarkable, and each climatic zone has its characteristic creatures. The mountains generally, and those districts of the Gangetic Plains contiguous, furnish a grand series of fine birds, and almost all the other animals most prized by the sportsman in India, or perhaps in the world. In the extreme north-west (Cashmere) can be collected the Gigantic Sheep (*Ovis Ammon*), the Burrell (*Ovis Nahura*), the Oorial (*Ovis cycloceros*), the *Ovis Vignei*, the Ibex (*Capra Sibirica*), Markhor (*C. megaceros*), four varieties, Tibetan Antelope (*Kemas Hodgsonii*), Indian Antelope (*A. Bezoartica*), and some of smaller species. Of *Cervidæ*, the grand Burra-sing (*Cervus Cashmiriensis*) or Cashmere Stag, a very fine species, frequenting the Saul Forests. The great Shou Stag, a species larger than the Burra-sing, and approaching the Wapiti in stature and magnificence of antlers, is a fine trophy that will well repay the hunter. But few specimens of this stag have as yet reached England. The little Musk Deer (*Moschus moschiferus*), etc. The Yak (*Bos grunniens*) may be got here, and also at the other extremity of the chain in Bhootan. Kyang, Wolf, Wild Dog, Lynx, Snow Bear, and Snow Leopard are found here. At the foot of the hills, and generally skirting the plain of the Ganges at this extremity, is a belt of swampy and densely-wooded country in some places only three, in others fifty miles wide, called the Terai, or marsh. This abounds with numberless animals. Kumaon, the wonderful hill district on the western edge of Nepaul, is nearly all forest and Terai. Tigers are very numerous, Leopards,

many Bears, Spotted Deer (*Axis maculata*), etc. Wild Elephants are plentiful, especially in the rainy season, and near where the land is cultivated. The Nepaulese dominion, which lies along the Himalaya range, has the Terai between it and the plains of Oude and Behar. Almost parallel to this belt, but a few miles further over the frontier, runs the great forest of Nepaul. It is generally only about ten miles wide. Therein are to be found plenty of Elephant, Rhinoceros (*R. Indicus*), and Tiger. Thar (*Capricornis Bubalina*), is a native of Nepaul, and is especially plentiful in the eastern regions of that territory; and only in the cold upper regions the Goral (*Nemorhedus Goral*) should be collected. The Terai, throughout its whole extent, is the ground for numberless Elephant, Rhinoceros, Tiger, Leopard, Panther, Cheetah or Hunting Leopard (*Felis jubata*), Bear, Lynx, Hyæna, Sambur (*Rusa Aristotelis*), Swamp Deer, often called Barasingha (*Rucervus Duvaucellii*), Muntjak (*C. vaginalis*), Four-horned Deer, Spotted Hog Deer (*Axis porcinus*), etc. The Himalayas furnish the most superb examples of the Pheasant group, among which is the grandest of all, the Monal or Impeyana; a splendid bird of this species, the *Lophophorus L'huysi*, should be looked for on the northern slopes; the Horned, the Cheer, the Snow, Kaleege, Cocklass, etc. Of other *Gallinæ*, there are many species of Partridges, the Black Partridge, Chickor, etc., and Pea Fowl, as well as an immense succession of perching-birds. Among the *Pavoninæ*, or Pea Fowl, the *Polyplectron*, often called the Argus Pheasant, which is peculiar to Indo-Chinese countries and Malayana, may be found here. But the true Argus (*Argus giganteus*) is to be got only in the Malay Archipelago. Of *Raptores*, the Golden Eagle (*A. chrysætos*), though rare in India, can

be collected on the Himalayas; and the *A. imperialis* is also found. The great Condor, often measures more than 13 feet from tip to tip of wings. The Houbara Bustard (*Otis hubara*), the great Brown Vulture (*V. Mcnachus*), the Tawny Vulture (*Gyps fulvus*), the Bearded Vulture (*G. barbatus*), and others, as well as many *Falconidæ*. At the north-eastern extremity of India, in Assam, the country is mountainous, but watered by the Brahmapootra and numberless tributary streams. The forests are among the best grounds for Elephant, and large herds are to be encountered there, affording grand hunting. The Swamp Deer (*Rucervus Duvaucellii*) is abundant; it prefers grassy and swampy jungle, hence its common English name. Not only in the forests, but in the gigantic grass jungle which is peculiar to Eastern Bengal, and extends to Assam, Tiger, Bear, Buffalo, Hogs, Fox, and Jackall, are to be had in plenty. Among the fine *Phasianidæ* to be got in Assam, are the *Lophophorus Sclateri*, which has been found on the Khasya hills, and the *Ceriornis Blythii*, both rare. In Burmah are many tracts still absolutely wild, almost untouched by man, and therein roam Elephant, Tiger, Rhinoceros, Leopard, and other, mostly smaller, *carnivora*: but no canine animals—Jackals, Hyænas, Wolves, Foxes, etc.,—which are curiously absent from this and the countries of tropical Asia lying east of Bengal. The Long-Billed Brown Vulture (*Gyps Indicus*) is very plentiful in Burmah; but the Peacock (*Pavo cristatus*), so common throughout all India, is not found either in Burmah or Assam.

The Sunderbunds, or marshy deltas of the Ganges below Calcutta, are a number of low islands covered by a rank growth of wood and apparently irredeemable jungle. The cover is full of great game, Tiger, many Buffalo (*Bos Arnee*), bearing the greatest horns of the

Bos genus, Rhinoceros, Deer, Hogs, etc. Alligators are numerous. Throughout Bengal most of the animals that abound in the Terai are to be collected, and the favourite grounds are to be easily found. The *Cervidæ* are plentiful, and of large size. In the Sunderbunds the Swamp Deer or Barasingha (*Rucervus Duvaucellii*) and Hog Deer (*Axis porcinus*) are very numerous, and along the whole course of the Ganges; a great variety of animals can be got on the banks of this wonderful stream. In the west of India, to the north and east of the Gulf of Cutch, is the Runn of Cutch, alternately a sandy saline desert, with numerous shallow lakes, or a vast lake-like marsh. Upon the banks, and in the small islands of the Runn, the Onager, or Wild Ass, exists in great numbers; there are many Apes, Porcupines, and birds in vast flocks. The Lion is now almost confined to the extreme north-western districts. The Peninsula of Guzerat is the most notable ground; but isolated specimens have, even in late years, been collected where once the noble game was plentiful, farther to the east in the Central Indian districts. In the wastes and jungles of Hurreeanah, and on the wooded plains along the Bhardar and Sombermuttee rivers, to the borders of Cutch, Lion may be found. They were undoubtedly very numerous there sixty or seventy years ago. The Peninsula of Guzerat, or Kattywar, as the whole province is named, is covered with undulations of no great height, but of wonderful ruggedness, and made almost inaccessible by forest and jungle. In the ravines and caverns of these tracts great game is harboured, Lion, Tiger, Leopard, Cheetah, Lynx (rare), Wolf, Hyæna, Black Buck (*Antilope Bezoartica*), Chikara Deer, Hogs, etc. Nylgai (*Portax Tragocamelus*) roam in large herds over the northern parts. But the climate in these districts is often

deadly to strangers, particularly after the autumnal monsoon. The Flamingo, Argala, or Adjutant Bird, Sarus, or Gigantic Crane, and many aquatic birds can be collected. But during the cold weather some of the best wildfowl and small game shooting is to be had in Guzerat. The neighbourhood of Ahmedabad is a favourite resort of Bombay sportsmen. As to *aves* in this connection something may be specially said. In Sinde the Black Partridge is met with; in the more southern districts the Painted and Grey varieties. The Demoiselle Crane is a cold weather visitor. These birds may be seen in flocks of several hundreds, as evening falls, sweeping away to their feeding grounds; and their peculiar cry may be heard at all times during the night in districts where they are. During the day they rest in the bed of some large river or in the shallow waters of a tank. The Sand Grouse (*Pterocles exustus*), sometimes called the Rock Pigeon, prefers rocky red soil wastes. Pea-fowl are found almost everywhere, most plentifully in the northern part of the Presidency, where they are frequently held sacred by the villagers, and round the villages are almost tame, but in the jungle they are very wary and vigilant for safety. The grey Jungle Fowl (*Gallus Sonneratii*) in Bombay replaces the Red, which last is rarely if ever met with south of the Nerbudda River. The Red Spur Fowl (*Galloperdix spadiceus*) is to be met with wherever the Jungle Fowl is found. A dog should be used to make them rise or they will not show. Snipe are to be found in all parts of the Presidency where tanks abound and free cultivation is carried on. Quails of several species are found, but the Rain Quail and the Grey Quail are the favourites. The Indian Bustard delights on the black soil plains, such as Kaladgi, Sholapore, etc. The Lesser

Florican Bustard, can be got only in the Bombay Presidency. The sport of hunting Antelope with the Cheetah can be seen in the native state of Baroda.

Central India is a fine ground. The hilly country, or Satpurá Highlands, may be said to range across the Peninsula from near Calcutta to Bombay, lying between those provinces designated as Northern India, and those of the Deccan or Southern country. This truly central position is, as it were, a border land between Northern and Southern India. At one period the Lion, as well as the Elephant, was common in these districts; but now the first-named may, for all hunting purposes, be pronounced extinct there, although an isolated example was met in the Sagar district not many years ago. The Elephant is now found only in the extreme eastern part of this region. Buffalo (*Bos Arnee*), which once was plentiful, has retreated from all save the eastern parts. They are found in the Mandla highlands during the rains, but they retire thence to the jungles south and west when the tame cattle are brought up to graze. They roam, however, in the great Saul forests that clothe the vast plains lying below Amarkantak to the north and east. They are not found west of Jubbelpoor and Nagpoor in these districts. In these eastern forests wild Elephants may be encountered, and this is the westernmost range here of this mighty creature. The number of them has, however, greatly decreased since the Government drove these forests systematically in 1865–67. To the north and east of Laäfargarh extends the Elephant country, where also may be found Tiger, Panther, Sambur, Black Bear, and Red Lynx (*F. caraval*), Spotted Deer, Red Deer, etc. Generally in the more westerly parts of the district are to be found Tiger—

more numerous at Doní and Betul than in Mandla—Cheetah or Hunting Leopard (*F. jubata*), Panther, Bear (*Ursus labiatus*), Wolf, Jackal, Boars on the plains. Barasingha (*Rucervus Duvaucellii*) may be met with in the patches of Saul forest, but it is not very plentiful there. Spotted Deer (*Axis maculata*) along the wooded banks of streams, Barking Deer, Sasin, sometimes called "Black Buck" (*Antilope Bezoartica*), but they have not so fine antlers as those in North-Western India; Indian Gazelle (*G. Bennettii*), Nylgai, Four-horned Antelope (*Tetracerus quadricornis*), commonly called "jungle sheep." Sambur is sure to be found in those localities where the Gaur is to be encountered. This last-named fine animal is one of the most characteristic and important, in a sporting sense, of Central India. He is called by sportsmen the "Indian Bison," and he frequents the hills, as the Buffalo loves the plains and swamps. Gaur is numerous on the Mahadeo Hills, but he retires before the advance of men and tame cattle—civilisation, in fact. Crocodiles (*Crocodilus biporcatus*), the Magar of Upper India, can be shot in the Nerbudda river. Tiger shooting proper commences in April, but March is good. During October and November, migratory wild fowl arrive and swarm on the rivers, pools, and tanks. Several sorts of Teal, including the Blue-winged Teal (*Querquedula crecca*), Duck, Widgeon, etc., and Geese. Many Waders, including the Coolen or Demoiselle Crane (*Anthropoides virgo*), and the Sarus Crane (*Grus Antigone*). Gray Quail, Painted Partridge, Jungle Cock, and Pea Fowl, afford good sport of its kind. The grand Imperial Eagle (rare in the South), the Florican Bustard, several species of Vulture, Hawk, and Owl. Blue Jay, Red Flycatcher, Mango Bird, Snake Bird, etc.

Southern India, viz. all that portion of the great peninsula below the 20th parallel, contains some of the finest grounds for big game, and, at the same time, some of the most convenient and healthy stations which the sportsman can make his head-quarters. On the eastern side, in the jungle on the deltas of the Mahanuddy, are many Tiger, Leopard, Buffalo, Crocodile, etc. Leopard is particularly plentiful in the forests of Cuttack, in Orissa. On the Deccan grounds, Tiger, Sloth-Bear (*Ursus labiatus*), Cheetah, Sambur, Nylgai, Spotted Deer, etc., and Hogs are numerous. Near the table-land of Mysore, on the wooded slopes of the valley through which the Moyar river runs, Elephant may be found, Tiger, Leopard, etc. On the Sheveroy Hills, in the Carnatic, Gaur may be got, as well as Tiger, Panther, Bear, Hyæna, Sambur, Spotted Deer (*Axis maculata*), Nylgai, and other Antelope. The Neilgherries, or Blue Mountains, furnish some of the most delightful stations in the world, and from Coimbatore, or Ootacamund (which last is the principal), some of the best hunting may be easily reached. The Wynaad jungle is a fine field. Therein may be met Elephant, Gaur, Tiger, Leopard, Cheetah, Panther, Hyæna, Wolf, Sambur, Spotted Deer (*Axis maculata*), Muntjak, and other *Cervidæ*; Neilgherry Ibex, a distinct species on the hills, afford fine sport; and the sportsman can get Partridge, Quail, Snipe, Woodcock, and Spur fowl in plenty. On the Annamullay Hills, and among the ravines at their base, great game is to be met, especially in the forest and jungle there, where Elephant can be had. All the immense forest south of the Neilgherries, extending over the Annamullay range along the Western Ghauts, is a very fine ground of glorious extent, and not yet over-hunted; therein

are many Elephant, many Gaur, Tiger, and Panther; Bears are most numerous. All these southern regions are indeed rich in *ferœ naturœ*. The district of Kanara is an especially good one for game; but it is unhealthy, and, on that account, not overdone. The whole district is covered with forest. The Kalanaddi and Gungawalli rivers water the country, and it is in the khans, or evergreen jungles along these and other streams, that the Gaur take up their range in summer. In that season they are extremely wary, and it is almost impossible to stalk them. May, June, and July are the best months for the sport, just after the first showers of rain, for then the Gaur and *Cervidœ* come out of their dense cover into the smaller jungles above and below the Ghaut to get the young grass and bamboos. Earliest dawn is the best time. Tiger, Panther (*Felis pardus*), and the small variety, *Felis leopardus*—noted for its ferocity here—Sloth Bear, Wild Dog, Sambur, Spotted Axis, Four-horned Deer, Muntjac (*Cervulus vaginalis*), Mouse Deer, are also sufficiently plentiful. The district is rich in *Aves*, and the rivers abound in fish. The Great Malabar Squirrel (*Sciurus maximus*) and the Gray Flying Squirrel (*S. fimbriatus*) are among the smaller animals that can be collected. Pigs abound. Of *Aves*, the Spotted Eagle (*Aquila nœvia*) should be collected, and the Tawny Eagle (*A. fulvescens*), especially in the Deccan. Malabar and the Neilgherries have several species of birds unknown in other parts of India, and the same, although in a much less degree, may be said of the Carnatic and Central Provinces. The Wild Dog's skin is worthless, but he should be shot whenever he is met with. He is a systematic hunter, and drives and disturbs all the game in the jungle.

CEYLON.—Elephant (*Elephas Sumatranus*) is the most important of the indigenous fauna, and exists in considerable numbers all over the island, excepting the populous parts. His favourite resort is the mountain tops; there are, however, not so many now as formerly. The species is almost always comparatively tuskless. Buffalo abound in all parts of the island, but most in the solitudes of the Northern and Eastern provinces. Gaur is said still to exist in some districts, but if so it is very rare. Sambur, often called Ceylon Elk (*Rusa Aristotelis*), on the mountains; Spotted Deer (*Axis maculata*) and Muntjak (*C. vaginalis*), in the forests of the interior, are the principal *Cervidæ*. Of *Carnivora*, Bear (*Ursus labiatus*) are in the thick woods of the low, dry district on the northern and south-eastern coast; Leopard (not Cheetah, as they are sometimes erroneously called), and a rare variety, quite black (*Felis melas*), can be got; Mongoos (*Hephestes vitticollis*) is comparatively common; Palm Cat (*Paradoxurus typus*), Genette (*Viverra Indica*). Only one example of *Edentata*, the Pengolin (*Manis pentadactyla*), or Scaly Ant-eater, is found. There are four species of Wanderoo Monkeys: some which inhabit the lowland woods; and others, the largest of which is the *Presbytes Ursinus*, are met only on the mountain zone. The rare *Presbytes Thersites* may be sought for, and a white variety may sometimes be captured. *Cheiroptera* are very numerous; the most curious of them is the Rousette (*Pteropus Edwardsii*), commonly called the Flying Fox. The birds are numerous and interesting. There are remarkable Cetaceans in the sea, among which is the Dugong (*Halicore dugong*).

INDIAN OR MALAY ARCHIPELAGO.—This is a wondrous region, full of natural historical wealth, and probably, in many respects, less known to science than any other part of the world. The islands are of vast importance. Borneo is more than twice as large as all Great Britain. New Guinea is larger than Borneo. Sumatra is as large as our whole home empire; and there are numbers of other islands, like Java, as extensive as Ireland or Jamaica. The great islands, Sumatra, Borneo, and Java were probably at one period part of the Asiatic Continent, and in them the animals and other natural productions are, many of them, of the Asiatic forms—some of identical species. In like manner New Guinea was, doubtless, connected with Australia, and we find there the Australian forms, both of animal and vegetable. On the Malayan peninsula Elephant, Rhinoceros, and Tiger may be got, and a few of the last-named game on the island of Singapore. On the mainland some of the birds are of great beauty. The true Argus Pheasant (*Argus giganteus*) is in the thickest forests: it is very shy and wary, and runs among the trees so swiftly and quietly that it is very difficult to collect. It is generally snared. The beautiful Eastern Trogons may be obtained here, and should be looked for in the deepest woods; the Blue-Billed Gaper (*Cymbirhyncus macrorhyncus*), the Green Gaper, Green Barbets (*Megalœma versicolor*), and other rich birds should be carefully preserved when captured. In the three great islands already named, Sumatra, Borneo, and Java, although the Asiatic forms prevail, there are several distinctive races. The Mias,* or Orang-utan

* Mr. Wallace records the following dimensions of a large old Mias killed by him: height, 4 ft. 2 in.; arms, from tip to tip of fingers, 7 ft. 9in.; face, 13½ in. wide; girth of body, 8 ft. 7½ in.

(*Simia Satyrus*), is found only in Sumatra and Borneo. Another species (*Simia Morio*), a little smaller, is only found in the same islands; the large Siamang only in Sumatra and Malacca. These great *Simiadæ* are peculiar to these regions.

SUMATRA.—The Mias, or Orang-utan, the Siamang, and *Simia Moria*, mostly in the low swampy forests. Elephant (getting scarce), Rhinoceros (*R. Sumatrensis*, two-horned); *R. Javanus* (one-horned) is said also to be in the woods; Tapir (*T. Malayanus*); Tiger; the Black variety of Leopard (*F. melas*); Balu Leopard (*L. Sumatrensis*); the rare Leopard (*F. macrocelis*), sometimes called the Clouded Tiger, having markings which partake of both characters; the Flat-headed Lynx (*F. Planiceps*) and Golden Tiger Cat (*F. aurata*) are among the principal *Carnivora*; the Black Ox of Sumatra (*Bos Banting*), somewhat resembling the Gaur. Of *Cervidæ*, the Banjoe, or Black Stag (*Cervus Hippelaphus*), Samboe (*Rusa equinus*), and Spotted Deer (*Axis maculata*) will be found; and Antelope (*Capricornis Sumatrensis*) in the hill forests. Sun-Bear (*U. Malayanus*); Squirrels are very abundant and curious; Argus, and some Ocellated Pheasants; Fire-backed Pheasants (*Euphocamus ignitus*); Bronze Cock (*Gallus æneus*), and *Gallus giganteus*. There are no Pea Fowl on this island, although it is nearest to the mainland. There are numerous smaller birds of great beauty and value.

BORNEO.—Mias and *Simia Morio* and the Long-nosed Monkey (*S. nasalis*), which last is found only on this island; Elephant, Rhinoceros. Black Leopards can be often met with. Golden Tiger Cat, Flat-headed Lynx, Sun-Bear (*U. Malayanus*), and a second species (*U. Euryspilus*); the Sumatran Ox (*Bos Banting*);

Samboe Deer (*Rusa equinus*), Spotted Deer (*Axis maculata*). Great Argus, and several pheasants.

JAVA.—Rhinoceros (*R. Javanus*), a distinct species. Tiger, Leopard (*L. Javanensis*), the Black variety (*F. melas*), and Bear (*U. Malayanus*), are the most important *Carnivora*. Banjoe, or Black Stag (*C. Hippelaphus*), Spotted Deer (*Axis maculata*), Muntjak (*C. vaginalis*), Wild Bull (*Bos Banting*). The birds and insects of Java are especially beautiful and various. The Peacock, not found in Sumatra or Borneo, reappears in Java; the species is distinct from the Indian. The Horn-bill (*Buceros lunatus*); *Gallus giganteus*; Jungle Cock (*G. Bankiva*) in plenty; the rare Green Jungle Fowl (*G. furcatus*). The Yellow and Green Trogons (*Harpactes Reinwardti*); the superbly splendid little Flycatcher (*Pericrocotus miniatus*); Black and Crimson Oriole (*Analcipus sanguinolentus*); all these last-named are rare, and are among the most notable to be found only in this island, and probably only in the western parts of it. The Great Crowned Pigeon (*Lophyrus coronatus*) is easily to be met with in this and other islands, but abundantly in New Guinea; so is the remarkable *Geophilus Nicobaricus*.

NEW GUINEA AND NEIGHBOURING ISLANDS.—The forms of both animal and vegetable life on the islands in this division of the Archipelago are mostly of Australian character. But the principal glory of the region in a zoological sense is the possession of a purely distinctive race of *Aves*, the Birds of Paradise. These are all of great value and transcendent beauty, simply forming one of the most beautiful groups in the world. For a long period all that was reported of their habitat was very trifling, and intermixed with mere fable: though much more is known now, our

information is comparatively scanty, and there is no region of the globe so little understood, and yet so calculated to well requite scientific exploration. Mr. A. R. Wallace who, a few years since, visited the islands for the purpose of investigating the *Paradisæ*, has recorded the best and latest information concerning their range and particular habitat, and the following is quoted from his words ("Proc. Zool. Soc.," 1863, p. 166): "The Aru islands contain *Paradisea apoda* and *P. regia*; and we have no positive knowledge of *P. apoda* being found anywhere else; Mysol has *P. papuana*, *P. regia*, and *P. magnifica*; Waigiou, *P. rubra* only. Salwatty, though so close to New Guinea, has no restricted *Paradisæ*, but possesses *P. regia*, *P. magnifica*, *Epimachus albus*, and *Sericulus aureus*. The island of Jobie, and the Mysory islands beyond it, certainly contain true *Paradisæ*, but what species beyond *P. papuana* is unknown. The coast districts of the northern part of New Guinea contain *P. papuana* and *P. regia* pretty generally distributed, while *P. magnifica*, *P. alba*, and *Sericulus aureus* are scarce and local. Lastly, the central mountains of the northern peninsula are alone inhabited by *Lophorina superba*, *Parotia sexsetacea*, *Astrapia nigra*, *Epimachus magnus*, and *Craspedophora magnifica*; and here also probably exist the unique *Diphyllodes Wilsoni* and *Paradigalla carunculata*." The birds frequent the deepest woods and trackless wilds. The indescribably beautiful Hoopoe, Promerops (*Epimachus magnus*), can be got on the coasts of New Guinea, and should be carefully collected and preserved.

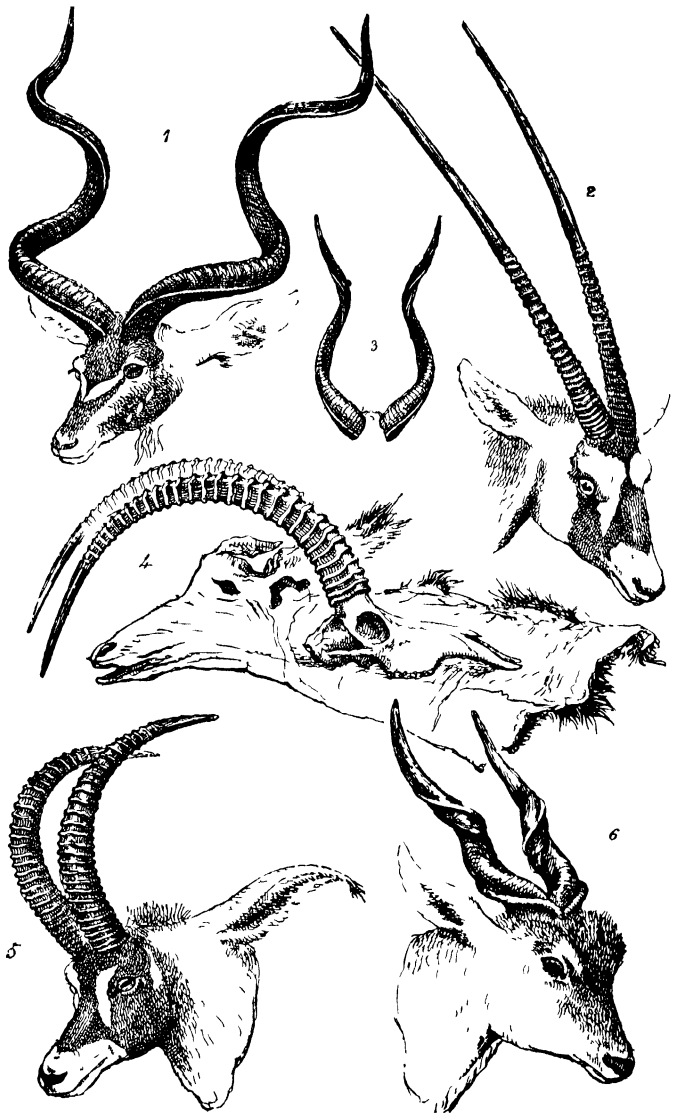
Australia.—It is the head-quarters of the *Marsupiata* and of the Parrot tribe. The species of *Marsupiata* are distributed in greatest numbers in

Western Australia and New South Wales; next in South Australia and Van Diemen's Land. In North Australia the species are neither so large nor so numerous. The Great Kangaroo (*Macropus giganteus*) is to be got in each division but the north; but another species of nearly equal size (*M. antilopinus*) is to be got there. The Great Rock Kangaroo, or Black Wallaroo (*M. robustus*), is found on the mountain ranges in the interior of New South Wales only. The Red Buck (*M. rufus*), also of the largest size, is found in many parts of the interior of Australia, but particularly New South Wales, where also another large species, the *M. Parryi*, abounds. Several species of Opossum and other smaller creatures can be collected. The very curious Duck-billed Platypus (*Ornithorhyncus paradoxus*) and the Porcupine Ant Eater (*Echidna Hystrix*) should be carefully preserved. The largest of the Australian *Carnivora* is the Tasmanian Wolf, or Zebra Opossum (*Thylacinus cynocephalus*), found now only in the highest mountainous parts of Van Diemen's Land. Of Birds the largest is the Emu (*Dromaius Nov. Holl.*), mostly in the south. The Lyre Bird (*Mœnura superba*) is found principally in the forests of the Blue Mountains, but also on the other mountain ranges generally of New South Wales. The curious Kivi-Kivi (*Apteryx Australis*) on all the islands of New Zealand, but most at the southern end of the middle island. An almost infinite variety of Parrots and Pigeons can be collected, as well as many aquatic birds. The Laughing Kingfisher (*Dacelo gigantea*), the Satin Bower Bird (*Ptilonorhyncus holosericeus*), should be looked for, as also the Great Bustard (*Otis Australis*).

AFRICA.—This vast continent is the habitat of countless great quadrupeds, and altogether of a pro-

AFRICA.

1. Koodoo. *Strepsiceros Kudu.*
2. Gemsbuck. *Oryx Gazella.*
3. Situtunga Antelope. *Tragelaphus Spekii.*
4. Sable Antelope. *Hippotragus niger.* (Scalp as saved on the field.)
5. Roan Antelope. *Hippotragus leucophæus.*
6. Eland. *Oreas canna.*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fusion of animal life that is perhaps unequalled on the globe. Vast regions of it are still unexplored, and there is ample verge for enterprise. The number of mammals is most remarkable, and of those peculiar to this continent the proportion is great. This is the true home of the Lion. The large Pachyderms are most numerous here; and the great Antelope tribe has its head-quarters in this division. Among the *Quadrumana* are the Gorilla and the Chimpanzee. In alluding, for the sake of convenience, to Northern, Southern, Eastern, or Western Africa, it should be borne in mind that, comparatively speaking, the great districts or natural divisions on the coasts are all that can be referred to with certainty; beyond all these, in the interior, lie fields for the hunter, where discovery of great natural facts may be pursued, while extraordinary sport is obtained.

Southern Africa alone—including in that title all the vast extent of country from the Cape to the Zambesi, and from Walfisch Bay to Quillimane—must be divided as a hunting-field into many different parts, as there are but few species of game to be met with at the present day throughout the entire country, whilst certain animals are quite confined to particular districts.

To begin then with the most southerly portions of the Continent, in Cape Colony the following wild animals may be met with: In the coast region the Bushbuck (*Tragelaphus sylvaticus*), Duiker (*Cephalophus mergens*, Grysbuck (*Nanotragus melanotis*), Bluebuck, Leopard (*Felis Leopardus*), Wild Dog (*Canis venaticus*), Bush Pig, Buffalo (*Bubalus Caffer*), and Elephant (*Elephas Africanus*). The latter two animals are protected, but permission can be obtained from Government to shoot one or two of each. Further

inland are found the Vaal Rhèbuck, the Red Rhèbuck, the Klipspringer (*Nanotragus oreotragus*), the Steinbuck (*Nanotragus tragulus*), the Oribi (*Nanotragus scoparius*), the Springbuck (*Gazella euchore*). In the Cradock and Beaufort West district, the Bontebuck; a herd is still preserved on Mr. Van der Byl's farm, near the Cape—and a few Cheetahs, Hyænas (*H. maculata* and *H. Brunea*), Koodoos (*Strepsiceros Kudu*), and true Zebras (*Asinus Zebra*).

In Natal are found the Bushbuck, Reedbuck (*Cervicapra Arundinacea*), Duiker, Steinbuck, Oribi, little Red Bushbuck, Bluebuck Vaal, and Red Rhèbuck, Klipspringer, Bush Pig, and Leopard.

In Zululand *were to be found, a few years ago,* Elephants, Rhinoceros of both the black and white species, Hippopotami, Buffaloes, Lions, Hyænas, Wild Dogs, Leopards, Cheetahs, Burchell's Zebras, Elands, Blue Wildebeests, Hartebeests, Koodoos, Waterbucks, Sassabies, Impalas, Inyalas (*Tragelaphus angasii*), Bush Pigs and Wart Hogs, besides all the smaller bucks mentioned as being found in Natal. Nowadays, however, all the more ponderous species of game, and many of the larger antelopes, are either quite or very nearly extinct, though they may all probably still be found in the countries to the north of Delagoa Bay.

In the open plains of the Orange Free State and the Transvaal, herds of Blesbucks, Springbucks, and Black Wildebeests, are still to be met with, but their numbers are becoming less and their range more circumscribed year by year; a few of the smaller species of Antelopes are also found in these territories, whilst in some of the northern and eastern districts of the Transvaal a few Lions, Giraffes, Buffaloes, and some of the larger Antelopes still linger.

AFRICA.

1. Waterbuck. *Kobus ellipsyprymnus.*
2. Wart Hog. *Phacochœrus Æliani.*
3. Lechwe Antelope. *Antilope Leche.*
4. Black Wildebeest. *Connochetes Gnu.*
5. Blue Wildebeest. *Connochetes Gorgon.*
6. Tsessebe Antelope. *Alcelaphus lunatus.*
7. Hartebeest (Lechtenstein's). *Alcelaphus Lichtensteinii.*
8. Springbuck. *Gazella euchore.*
   White Rhinoceros. *Rhinoceros bicornis.*
9. Klipspringer. *Nanotragus oreotragus.*
10. Grysbuck. *Nanotragus melanotis.*
11. Oribi Antelope. *Nanotragus scoparius.*
12. Mohr. *Gazella Sommeringii.*
13. Reedbuck. *Cervicapra Arundinacea.*
14. Bushbuck. *Tragelaphus sylvaticus.*
15. Blesbok. *Damalis albifrons.*
16. Impala. *Æpyceros Melampus.*
17. Hartebeest. *Ascelaphus Caama.*

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North of the Transvaal, and between the Limpopo and the Zambesi rivers, may be found Elephants (few and far between nowadays); Black and White Rhinoceros, almost entirely confined to northern Matabele land and portions of the Mashuna country; Hippopotami, plentiful in the Zambesi and all its larger affluents; Buffaloes, still very numerous along the Chobe as well as on all the tributaries of the Zambesi to the east of the Victoria Falls; Giraffes; Elands; Gemsbucks, entirely confined to the western deserts; Sable Antelopes, very numerous in the Mashuna country; Roan Antelopes; Koodoos; Waterbucks; Hartebeests, whose range is very similar to that of the Gemsbuck; Sassaby Antelopes; Flat-horned Hartebeests, found near the river Sabi, in south-eastern Mashunaland; Impalas; Lechwes, common in the swamps of the Botletlie, Mababe and Chobe rivers; Pookoos (*Cobus Vardoni*), only found in a small district of country on the southern bank of the Chobe; Situtungas (*Tragelaphus Spekei*), only found in the swamps of the Mababe, Machābe, and Chobe rivers; Blue Wildebeests; Burchell's Zebras; Reedbucks; Oribis; Duikers; Klipspringers; Spotted Bushbucks (*Tragelaphus sylvaticus*); Grysbucks; Bush-hogs and Wart Hogs; besides Lions, found throughout the country wherever there is game; Leopards; Cheetahs; Spotted Hyænas; Wild Dogs; Red Lynx (*Felis caracal*); Servals (*F. serval*); Gray Cats; Ratels; Otters; Porcupines; Antbears; three species of Jackals, etc.

Many of the birds are very notable, among which may be particularised: Ostrich; Kori Bustard (*Otis Kori*), the largest of the genus, upwards of five feet high, very five game, found especially in the countries

on the banks of the Orange river; another, *Otis Denhami*, always where Gazelles are; and the African Bustard (*Otis cœrulescens*). The gigantic Stork (*Ciconia Marabou*). Flamingo (*Phœnicopterus ruber*), multitudes in the neighbourhood of Walvisch Bay; and the small species (*P. parvus*) on the lakes; Demoiselle Crane (*Anthropoides virgo*), Secretary Bird (*Gypogeranus Serpentarius*), the superbly beautiful *Promerops erythrorhyncus*, and Golden Cuckoo; Bee-eater (*Merops apiaster*), Roller (*Coracius garrula*), in deep forests; Sun-birds, etc.

Western Africa yields the Gorilla (*Troglodytes Gorilla*), the Chimpanzee (*T. niger*), and two other great anthropoid Apes (*T. Aubryi*), and the rare one described by Du Chaillu, called by him *T. Koolo-Kamba*, as well as *T. calvus*, all of which are valuable. They are found in the most remote woods of the Gaboon district. The very handsome King Monkey, sometimes called Full-bottom, on account of its extraordinary wig-like hair (*Colobus polycomus*), and several other species of *Colobi* can be got near Sierra Leone. The Lion of Senegal is distinguishable by a yellower colour than its congeners, but the mane is mostly inferior. Panther (*F. Pardus*), Leopard, two species (*F. Leopardus* and *F. neglecta*), Striped Hyæna (*H. striata*), Lynx (*F. caracal* and *F. caligata*), Hippopotamus. Of Antelopes: the Mohr (*G. Sommeringii*), Kevel (*G. rufifrons*), Red-crowned Bushbuck (*Cephalopus coronatus*), the White-backed (*C. sylvicultrix*), the Bay (*C. badius*), the Black-striped (*C. Ogilbii*), the Black (*C. niger*), the White Oryx (*Oryx Leucoryx*), Korrigum (*Damalis Senegalensis*), and the Doria, or Gilded Antelope (*Doria Zebra*), a perfect specimen of which is rare in England, and should be sought for.

Of Birds in these countries: the Pheasant-like Touracos, the beautiful *Corythaix Senegalensis, C. erythrolophus,* a superb species, *Chizoeris variegata,* and the magnificent *Musophaga violacea,* can be found frequenting the highest trees about the Gold Coast. The Spur-winged Plover (*Philomachus spinosus*) should be sought for, and its habits, of which little is known, recorded; Gigantic Stork (*Ciconia Marabou*), Flamingo, Demoiselle Crane, Crowned Crane (*Balearica pavonina*); Jabiru, a large wader, about the lakes and marshes; Great Kingfisher (*Ispida gigantea*), Secretary Bird, Roller, Sun-birds, etc.

In the Northern countries of Africa will be found: Lion, having in these districts a deep yellowish-brown coat and grand mane; Leopard, Lynx, *F. caracal, F. caligata,* and *F. chaus*—the last-named most frequently about marshes and bogs; Striped Hyæna (*H. striata*), Wolf, Jackal; Gazelle (*G. Dorcas*), Addax (*A. nasomaculatus*), plentifully; Bekker-el-Wash, or Wild Ox, as the Arabs call him (*Alcephalus Bubalis*), to the borders of Sahara; in Barbary, the Bush Goat, or Barbary Deer (*Cervus Barbarus*), the only member of the *Cervidæ* on this continent. Among the birds are—Flamingo, Demoiselle Crane, Crowned Crane, Roller, etc. Several Vultures, the Griffon (*V. fulvus*), *V. Kolbii, Neophron percnopterus,* and other of the *Raptores.*

Eastern Africa: Hippopotamus, in the Nile; Elephant, in Abyssinia, where also, on the hills, Mohr (*Gazella Sommeringii*), Andra (*G. ruficollis*), *G. Dorcas, G. Isabella,* Oryx (*O. Leucoryx*), and the remarkable Antelope (*Hippotragus Bakeri*) discovered (1868) by Sir Samuel Baker, are principal quadrupeds. The Ibis, Spur-winged Plover, many Storks, including *Ciconia Marabou.* Flamingo, in Egypt.

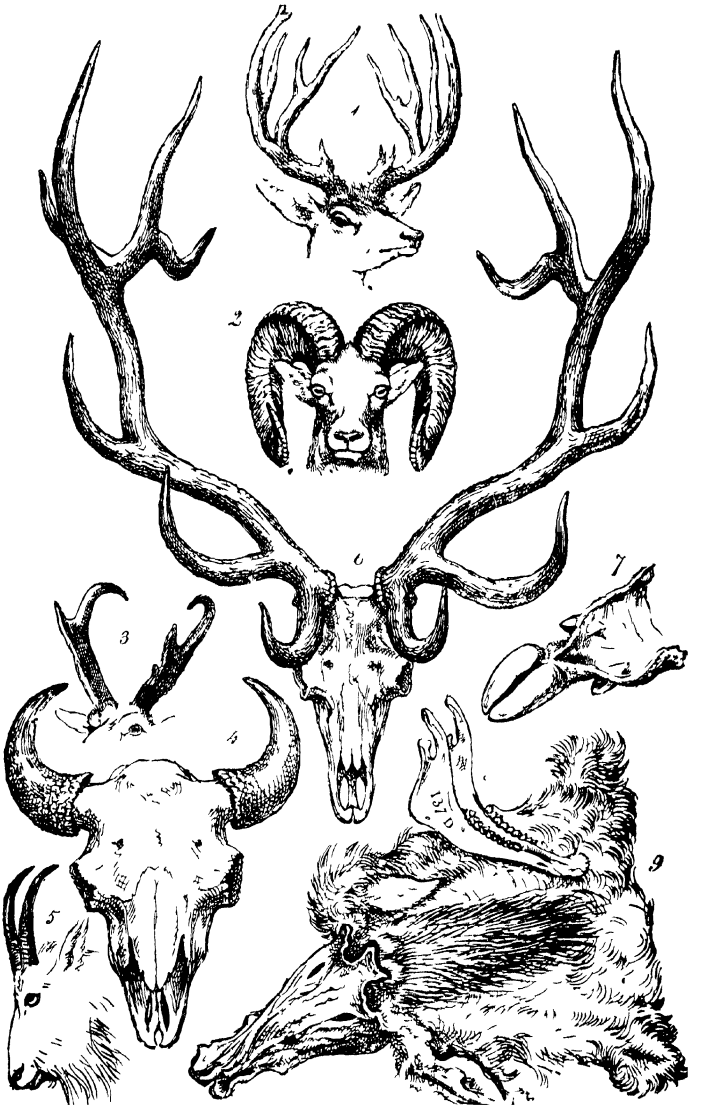
AMERICA.—The New World continent possesses several animals which afford grand sport for the hunter, but altogether the forms of animal life are not so highly developed as those of the ancient great divisions of the world. The birds, however, of Central and South America are more beautiful and resplendent with gorgeous plumage, as well as more various, than are those of any other countries. The ornithology of North America is also remarkable and valuable.

In North America the progress of those influences which tend to disturb great game, and to alter its habitat, are more rapid in their operation than anywhere else in the world. Of late years great change have been wrought, particularly in regard to the Bison or, as it is termed, the Buffalo (*Bison Americanus*). The utterly wasteful slaughter of this animal, as well as of Elk, Wapiti, Deer, and Antelope, that has gone on of late years for purposes of trade* has exterminated the Bison from some of his grounds, and made him scarcer and more shifting on others; it has been destructive of the *Cervidæ* beyond all incidence of sport. It is better not to attempt here too definitely to indicate the best districts. The sportsman will act wisely in seeking indications on the spot, when he visits the districts of

* Lieut.-Col. R. I. Dodge (U.S.A.) has estimated on trustworthy information that the number of Buffalo thus destroyed during the years 1872-74 amounted to upwards of five and a quarter millions! In 1880, the shipment of Deer and Antelope hides on the Missouri and Yellowstone was approximately 167,000; in 1881, 143,000—about 75 per cent. of the animals actually killed. Last year the Deer were followed to their summer retreats on the mountains. The trade-hunters reached far with a bloody hand!

AMERICA.

1. Black-tailed Deer. *Cervus Lewisii.*
2. Big Horn, or Rocky Mountain Sheep. *Ovis montana.*
3. Prong Horn. *Antilocapra Americana.*
4. Bison (Buffalo). *Bison Americanus.*
5. White Goat of Rocky Mountains.
6. Wapiti. *Cervus Canadensis.*
7. Deer-slot—to show skinning.
8. Wapiti—lower jaw.
9. Scalp of Wapiti, as saved on the field.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the Saskatchewan or of the Red River, or the North-western Prairies. There are two varieties of the animal recognised by local hunters, viz. that of the great plains, which generally avoids woods and high ground, and that, much scarcer and more wary, which frequents cover and rocky places. This last named is only found north of the Saskatchewan and on the flanks of the Rocky Mountains. Great Slave Lake is the northern limit of these grand animals. Moose (*Alces Malchis*) is the largest of the *Cervidæ*; the best grounds are in Canada, chiefly in Nova Scotia and New Brunswick, and in the country to the south of James Bay towards Lake Winipeg. Caribou (Reindeer) range in the regions north of the St. Lawrence; there are many in the interior of Newfoundland and of Labrador, and between Hudson's Bay and Alaska. For Rocky Mountain sport, Wyoming Territory is a good headquarters; and there, in the passes of the Black Hills to Laramie Valley, about Laramie Peak, and the Horseshoe, are good grounds where most of the animals now to be particularised can be got. The Wind River districts and the Soshoné Ranges offer some of the freshest grounds. For this region the season is all important. September is a good time. Wyoming and Montana are the best game districts now.

Wapiti (*Cervus Canadensis*), four and a half feet at shoulder. These magnificent game are great travellers, and shift their ground widely and with rapidity. They are subtle at "doubling, dodging, and hiding," so that cover increases the difficulty of matching them in heavy ratio. They die hard. Prong-horned Antelope (*Antilocapra Americana*), Big-horn Sheep (*Ovis mon-*

tana). These last-named are shy and difficult to get. They frequent the highest and most inaccessible points. Their habits must be studied. They are partly nocturnal in their feeding, and for this come to the lower grounds. They ascend for safety, and always look below them for danger. The best way to stalk them is first to detect their presence by tracks, then some hours before daylight take a chosen point of vantage high up, whence you can observe as you lie well concealed, till at earliest dawn the Big-horn will come up from its lower feeding-ground, with all its suspicions directed below, toward its real danger above. To hunt them from below is to compete with them in the gaining of inaccessible places, a wasting competition. Prong-horn are still numerous on the great prairies that touch the Rocky Mountains to the east, as well as in Sonora and North-west Mexico. In Nebraska, on the Calamus and the North Loup, fine numerous herds of Wapiti have been recently met. A smaller variety of the same deer is to be found on the plains of California and upper parts of the Missouri. Other *Cervidæ* are White-tailed Deer (*C. leucurus*), American Deer (*Cariacus Virginianus*), most numerous on the Pacific coast; Mexican Deer (*C. Mexicanus*, Cariacou Deer (*C. nemoralis*), Texas and Mexico; Black-tailed Deer (*C. Lewisii*), California; Mule Deer (*C. macrotis*), eastern slope of Rocky Mountains. Of Carnivora: Grizzly Bear (*Ursus ferox*), Cinnamon Bear, Black Bear (*U. Americanus*), Polar Bear (*Thalarctos maritimus*), in the Northern Sea; Puma (*Felis concolor*) which takes the place of the Lion in the New World, can be met in the Southern States below New York. There are two varieties, and sometimes a black ex-

ample is met with. Lynx (*F. Canadensis*), in the woody districts of Canada. Many of the smaller fur-bearing animals, among which is the large Otter (*Lutra Canadensis*), peculiar to the northern districts, and the Opossum (*Didelphys Virginiana*). The Water Fowl are innumerable and fine, of numberless species. Red Flamingo (*Phœnicopterus Chilensis*) in the warmer parts, but the colour is not so good as that of the European species. Among the *Raptores* will be found —Bald Buzzard (*Pandion Haliætus*), the Sea Eagle (*H. leucocephalus*), the symbol of the United States, in every part of which it may be encountered, and the Golden Eagle. The Harpy Eagle (*Harpyia destructor*) must be sought in the thick forests of Mexico. The fine ivory-billed Woodpecker (*Picus principalis*) can be got in Mexico and some of the Southern States, but never north of Virginia. In Mexico and Guatemala may be collected the Trogons, perhaps the most superb of all birds. They are never found on open places or inhabited tracts, but are of solitary habits, frequenting the deepest woods. *Trogon resplendens*, the most splendid in colour and of finest form, should be sought for; *T. Mexicanus*, of exquisite and varied colouring, is in the north of Mexico; there are other species of almost equal beauty. The Wild Turkey (*Meleagris Gallopavo*) is plentiful in the North-Western States, and ranges to the Isthmus of Darien; another species of singular beauty, *M. ocellata*, may be got in Honduras. The Galeated Curassow (*Ourax Pauxi*) and the Crested Curassow (*Crax Alector*) may be collected in Mexico.

South America is not very rich in great game, but has overwhelming interest for the naturalist. Of *Carnivora*, the principal are Puma (*F. concolor*), as far

south as Paraguay, in Chili, and generally throughout Brazil—the Gray variety is never got north of the Isthmus; Jaguar (*F. Onça*) is found generally about this half of the continent, but most numerously in Paraguay and the Brazils. There is a handsome black variety of this Cat to be met with frequently. Three species of Ocelot can be collected in Paraguay, and probably in Peru, viz., *F. pardalis*, the Gray (*F. armillata*), and the Painted (*Leopardus pictus*). The Chati (*F. mitus*), Pampas Cat (*F. Pajeros*), and several others of similar species, as far south as Patagonia. In this extreme district of the Southern Continent the Llama or Guanaco (*Auchenia Huanaca*) can be found in numbers, about Port St. Julian, and indeed inland from almost every harbour on the Atlantic coast. This animal goes in herds and affords excellent stalking. There are many wildfowl, and abundant sport can be had by those who are able to reach this seldom visited coast. Farther south, on the Straits of Magellan, as far as Punto Arenas, similar game can be found in plenty, and all this range of coast from Monte Video to Punto Arenas includes some of the finest natural scenery in the whole world. For a yachting voyage, so arranged that excursions can be made inland, this region, as yet almost untouched by the sportsman, presents exceptional advantages. Otter (*Lutra Brazilienses*), is plentiful in the lakes and rivers of Paraguay. Llamas (*Auchenia Huanaca*) are in Columbia, Peru, Chili, on the Cordilleras of the Andes, but recently reduced in numbers; they are also in Paraguay, but more rare. Tapir (*Tapirus Americanus*), all over South America, but never north of Darien. Of *Cervidæ*: The Guazupuco (*Blastocerus paludosus*) and Mazame (*B. campestris*), northern Patagonia; Tarush (*Furcifer*

antisiensis), mountains of Bolivia; Guemul (*F. Huamel*), on eastern coast; Cariacou (*Cariacus nemoralis*), Guiana; the beautiful little Gauzu-viva (*Coassus nemorivagus*), Brazil; the Cuguacu-ete (*Coassus rufus*), large herds in the marshy woods; several species of Brocket in Brazil and Chili. The birds are wonderfully varied and beautiful. The American Ostrich (*Rhea Americana*) is numerous on the plains of La Plata, as is also the smaller species (*R. Darwinii*). Several fine *Raptores*: Condor of the Andes (*Sarcoramphus Gryphus*), one of the largest of the *Vulturidæ*, mostly in Peru and Chili; Caracara Eagle (*Polyborus Braziliensis*), on the coasts of Venezuela and Brazil, most abundant in the south and east of Brazil, and in Paraguay. Harpy Eagle, in Caracas, Guiana; Brazilian Eagle (*Morphnus Urubitinga*), *Asturina cinerea*, and numerous other *Falconidæ* in Guiana and Brazil. The naked-cheeked species are confined to the southern parts of the continent. Red Flamingo, Peru, Chili, coasts of Brazil, and Guiana; the great Stork-like Jabiru (*Mycteria Americana*) will be found generally on the marshes and round lakes; while about similar places in Brazil and Guiana those curious fine birds, the Horned Screamer (*Palamedea cornuta*) and the Chaja (*Chauna Chavaria*) may be met with, the last named in Paraguay, and La Plata as well; the Çariama (*Palamedea cristata*), a bird of retiring habits, frequents the mountain plains of Brazil, and is found in Paraguay, but is scarcer there. Of *Cracidæ*, the Crested Curassow (*Crax Alector*), and the Guan (*Penelope cristata*), are in Brazil and Guiana; the *Ortalida Motmot*, a pheasant-like bird, and the Hoazin (*Opisthocamus cristatus*), and others, in Guiana; the Red-knobbed Curassow (*Crax Yarrellii*), in Peru.

Ivory-billed Woodpecker (*Picus principalis*), in Brazil. The beautiful Cock of the Rock (*Rupicolla aurantia*), now becoming rare, in Guiana, especially about the river Oyapock; another of this species, the *R. Peruviana*, is in Peru. The Great Toucan (*Ramphastos Toco*), in the wooded districts of the river Plata and Guiana; others, *R. Cuvieri*, *Pteroglossus Humboldtii*, and the Black-banded Toucan (*P. pluricinctus*), about the banks of the Amazon. Several species of the exquisite *Piprina*, and other magnificent Chatterers, or Fruit-eaters, are in Brazil and Guiana. These last-named countries, with Peru and Chili, and the Tropical regions generally, are the home of the incomparable *Trochilidæ*, or Humming Birds, which are found mostly about the marshy deltas and the banks of the rivers. Thousands of gorgeous Macaws, and various species of *Psittacara*, or Parakeets, inhabit the warm districts of the Andes, the Brazils, and Guiana.

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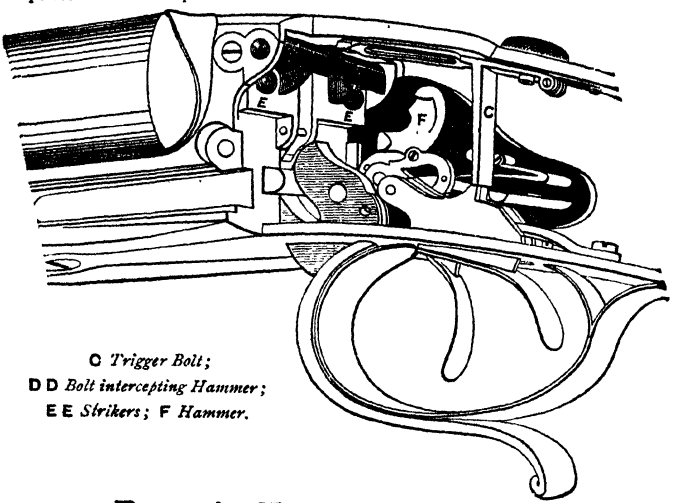

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